ELECTRICAL TIMES

THURSDAY
7 DEC.
1950
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The Coiled Coil filament in the Mazda Silverlight lamp means an increase of up to 20% in the amount of light for the same current consumption.

Patents applied for

MAZDA SILVERLIGHT coiled coil Tungsten Lamps are designed specially for installations where the lamp is wholly or partially visible. Glare is eliminated. A soft white light is spread evenly over the entire lamp. This almost perfect diffusion means a softer, kinder, more luxurious light, and makes reading and all "seeing" tasks easier and infinitely more enjoyable.

MAZDA **THE OUTSHINING LIGHT**

MAZDA LAMPS AND LIGHTING EQUIPMENT

Made in England by B T H *Leaders in Lighting*

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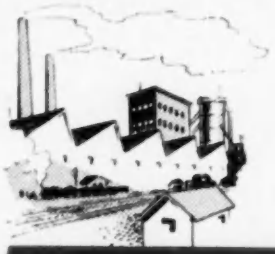
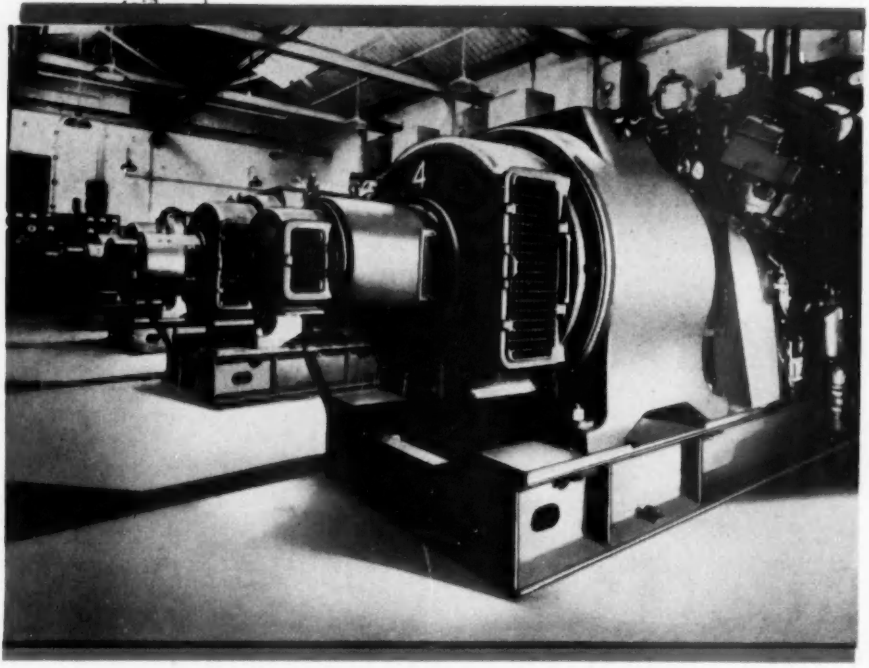


For your own generation



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with the STEEL battery

NIFE BATTERIES · REDDITCH · WORCESTERSHIRE

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APPROVED and GUARANTEED
CONTROL GEAR

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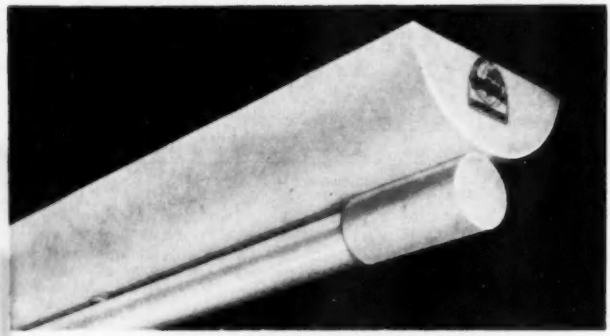

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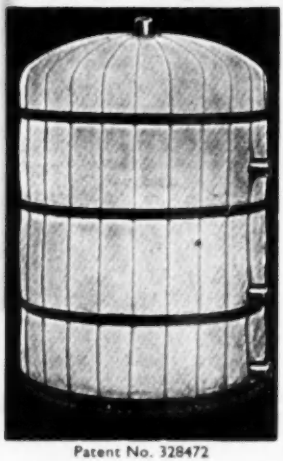

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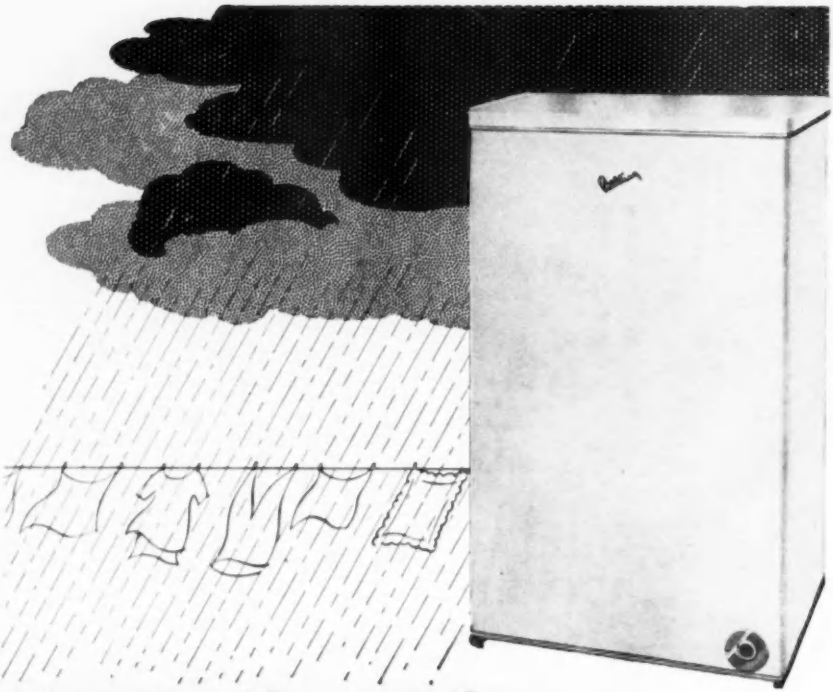

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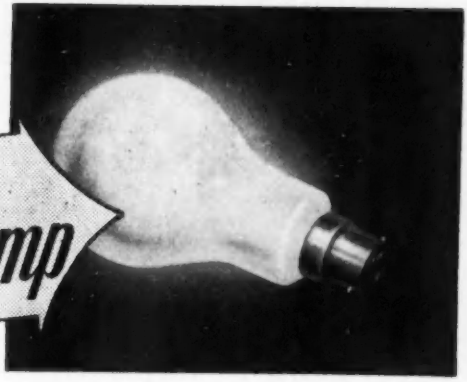

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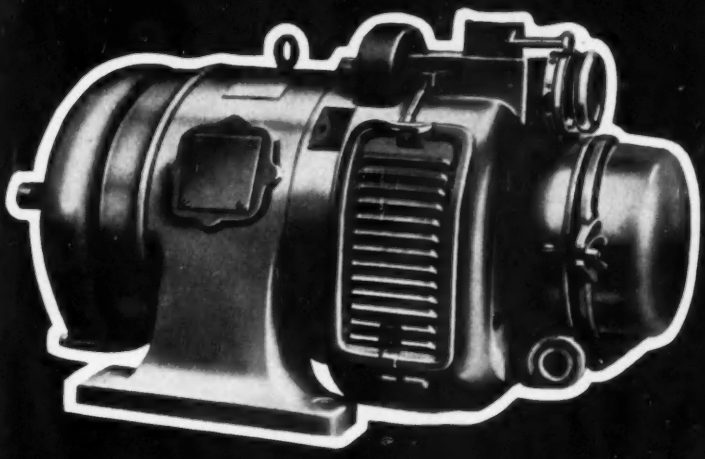

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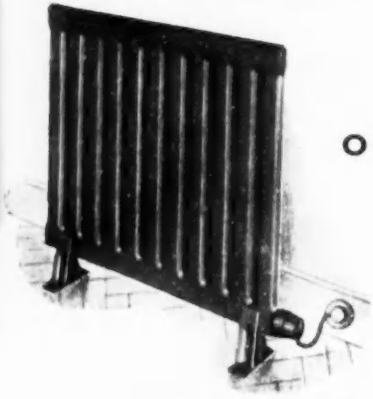

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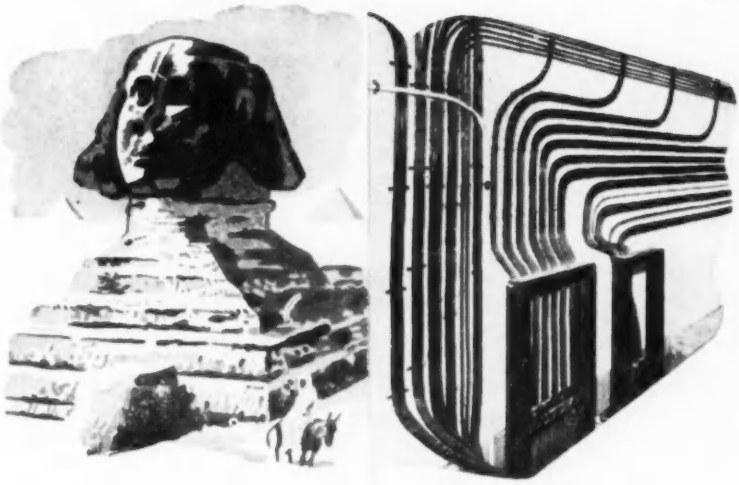

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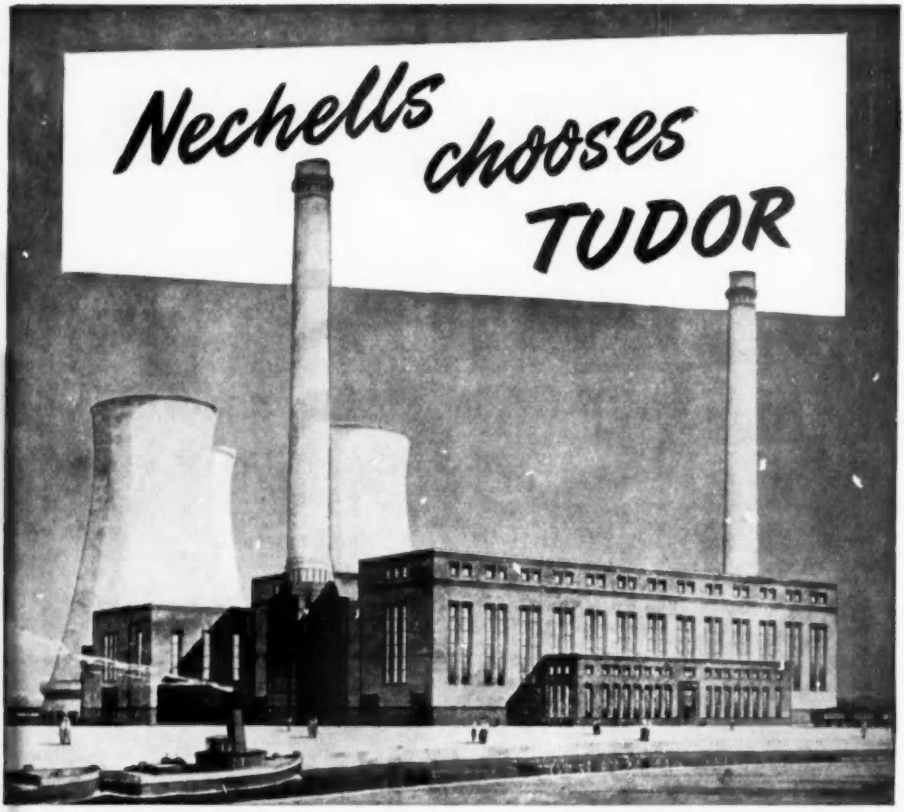
Nechells chooses TUDOR



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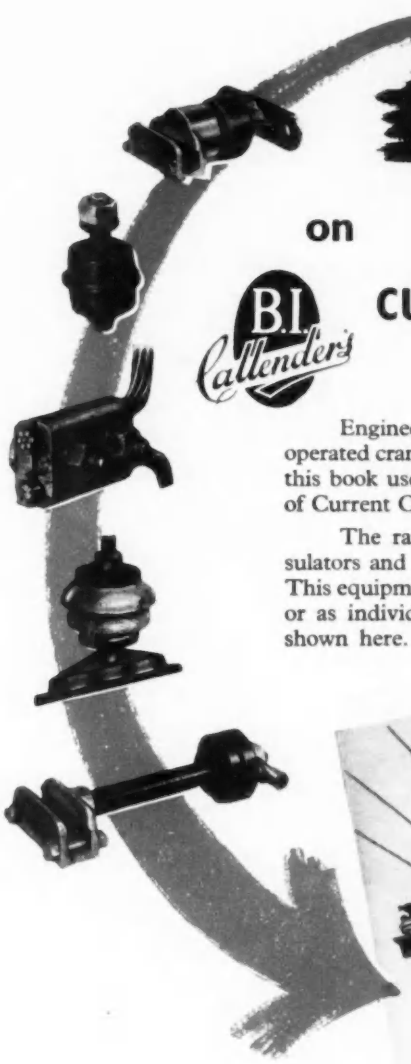

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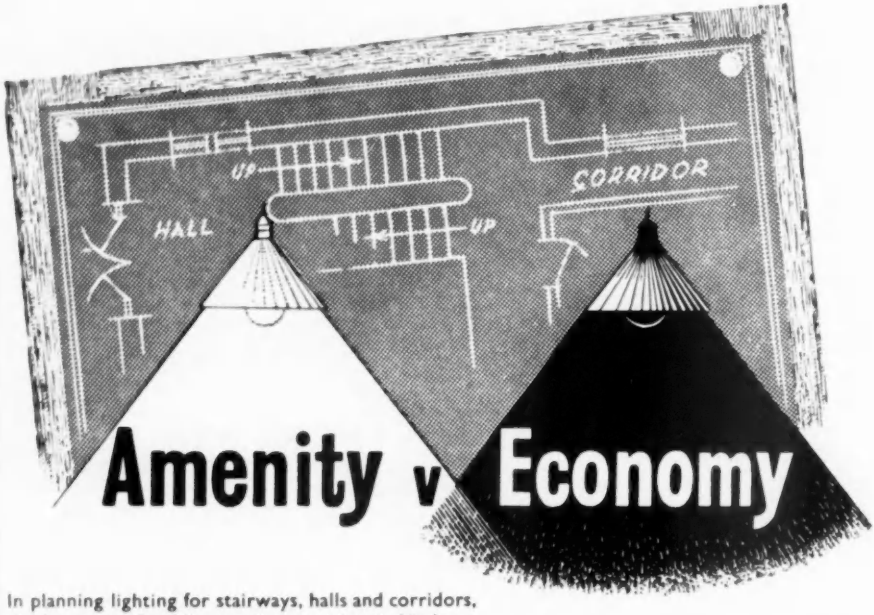

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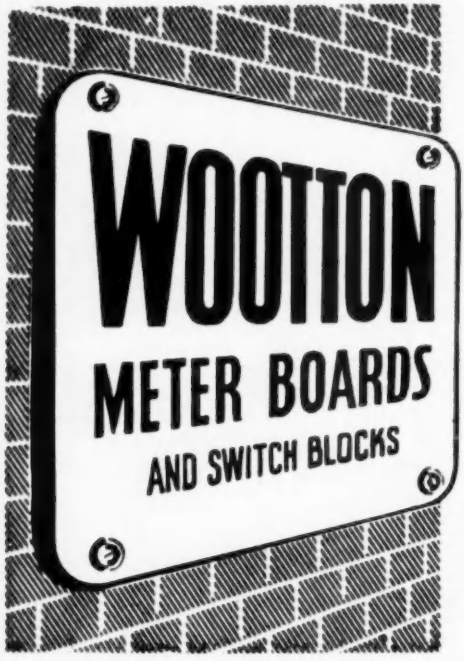

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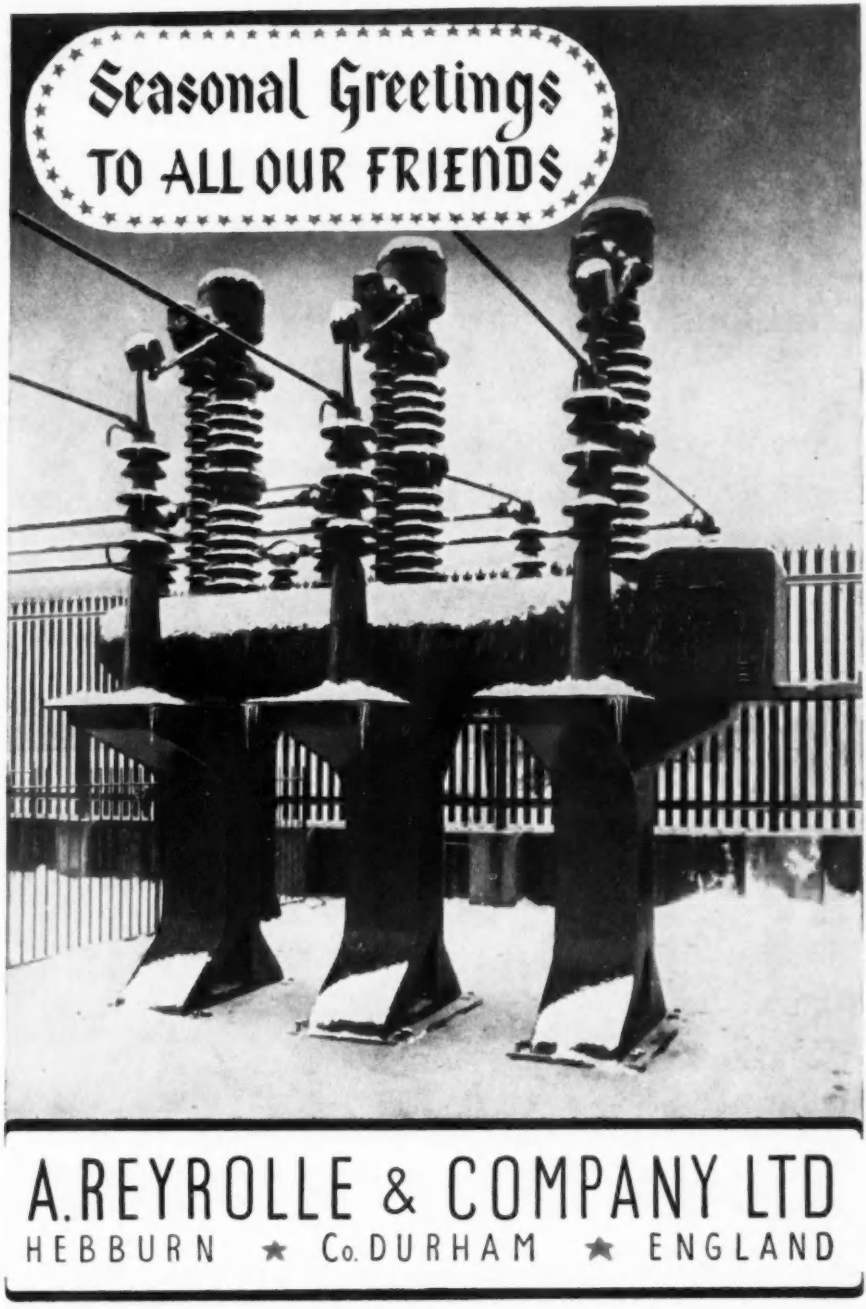

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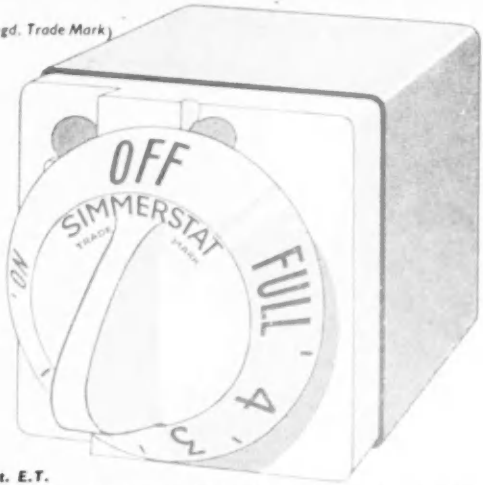

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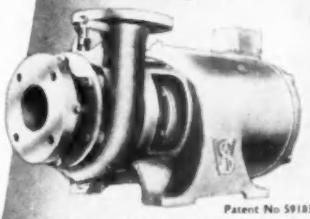

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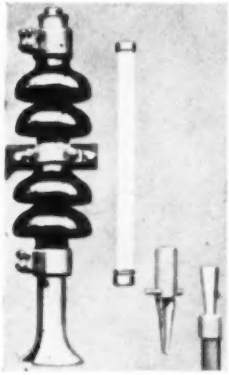

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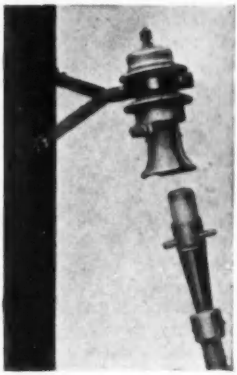

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300-amps. 400/440-volts

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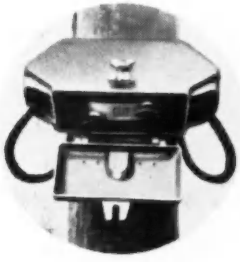

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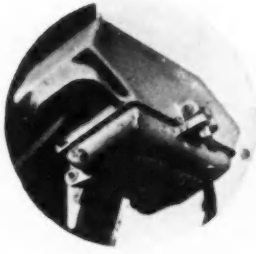
- ★ Self-sealing cable entries.
- ★ Double mechanical clamps on each cable terminal.
- ★ Case freely ventilated to retard condensation — no gaskets used.



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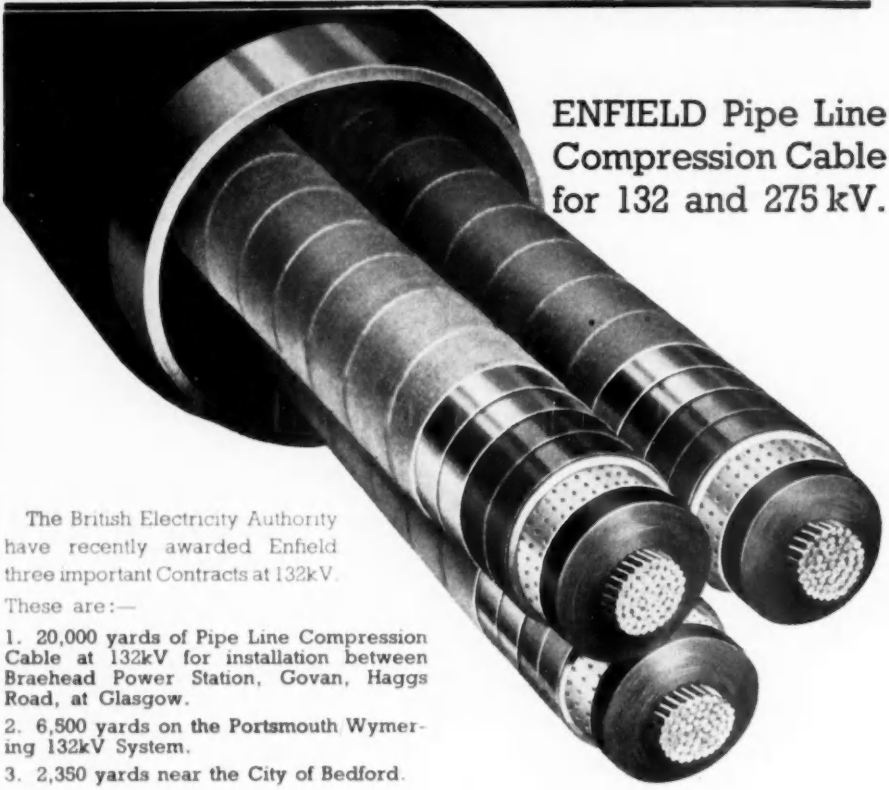

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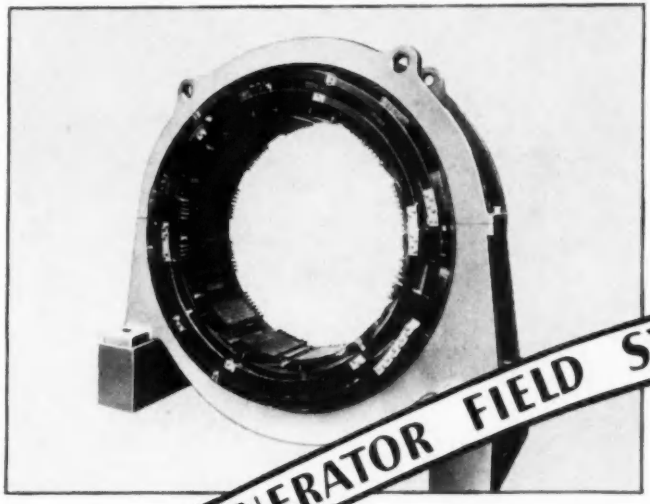

12 pole D.C. GENERATOR FIELD SYSTEM with compensating windings

D.C. GENERATOR FIELD SYSTEM

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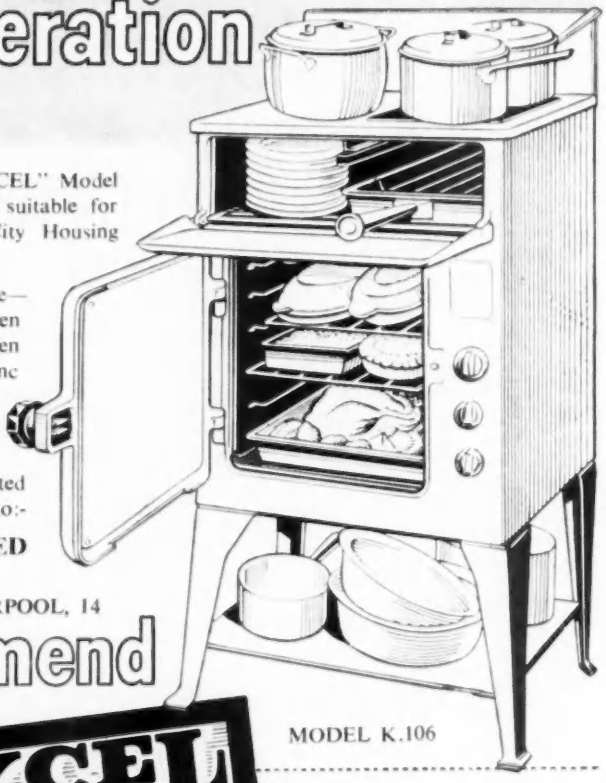

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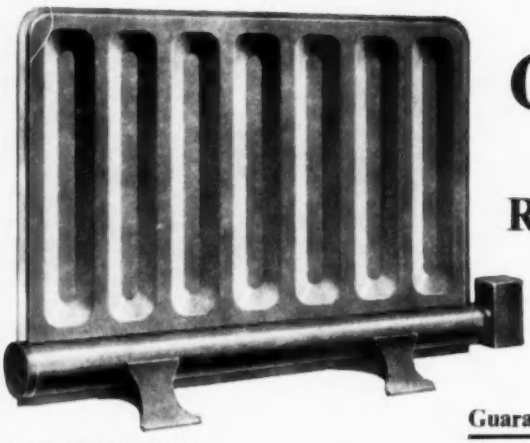

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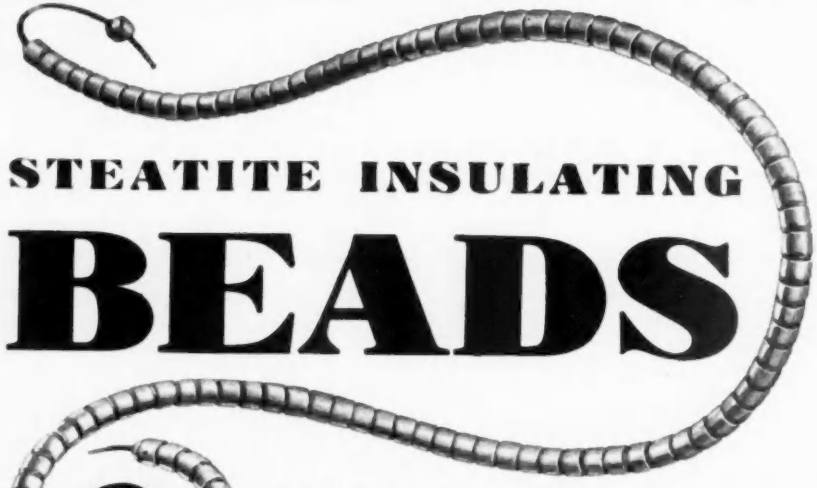

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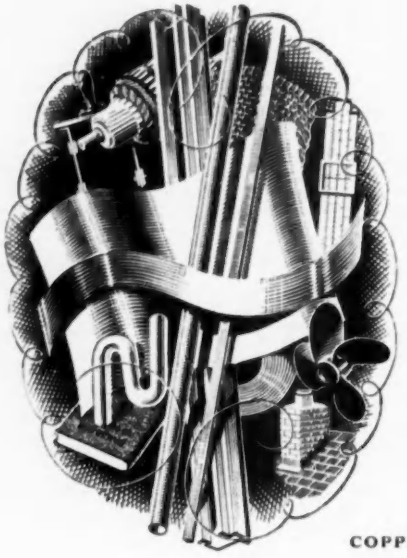

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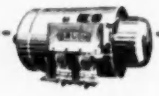
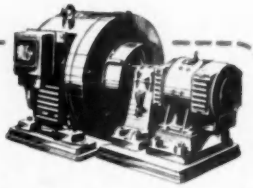
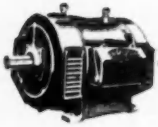


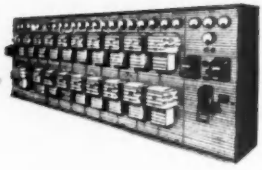
ALTERNATORS

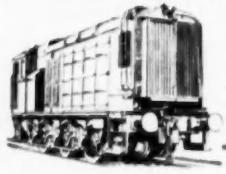


'T' TYPE MOTORS

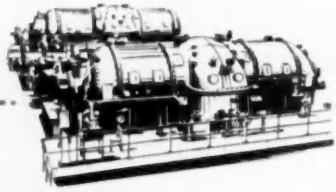


SWITCHGEAR & SWITCHBOARDS





DIESEL-ELECTRIC LOCOMOTIVES



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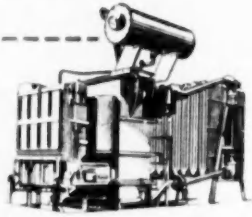

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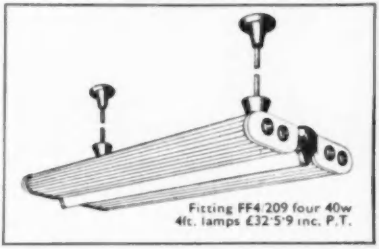

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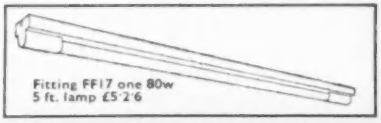

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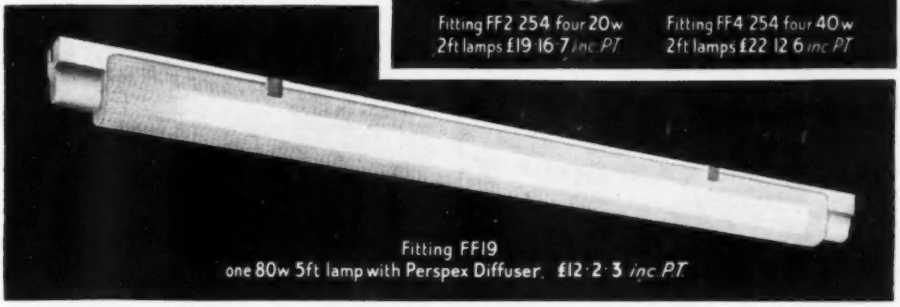

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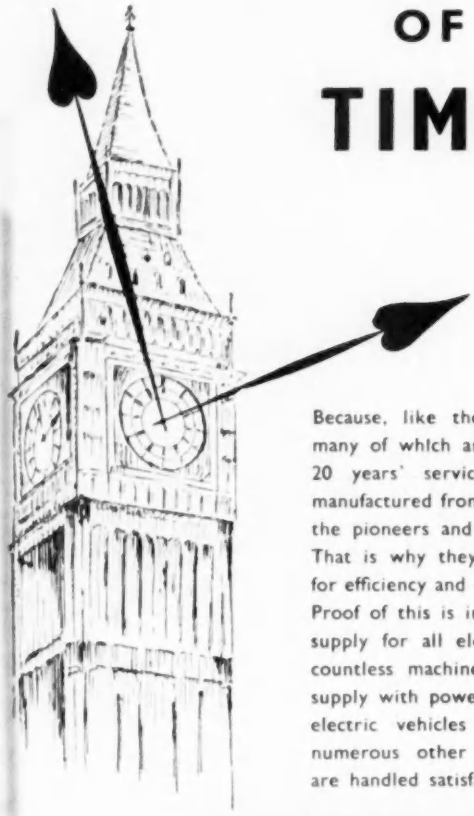

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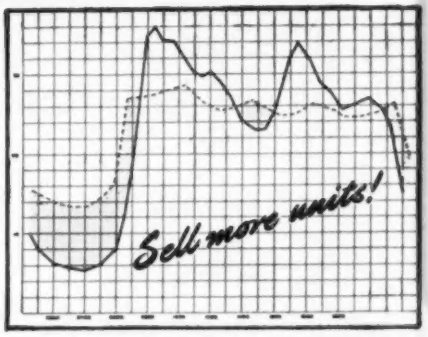

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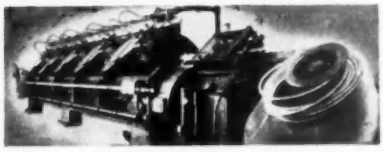

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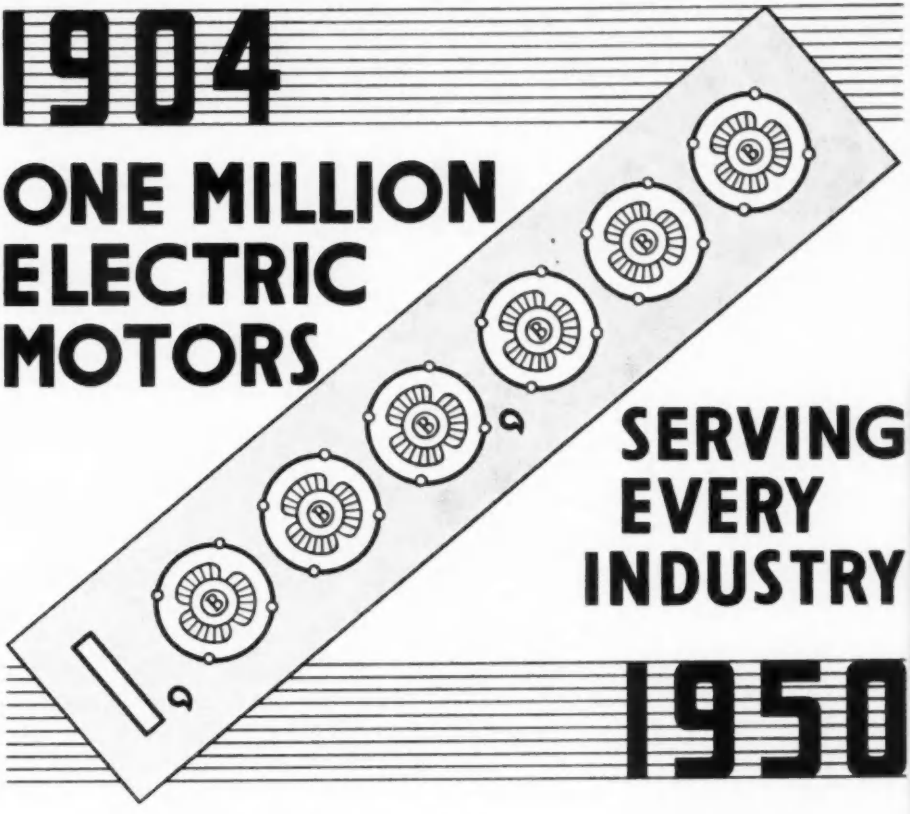

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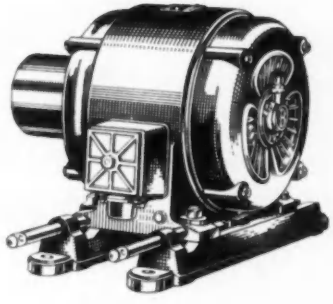

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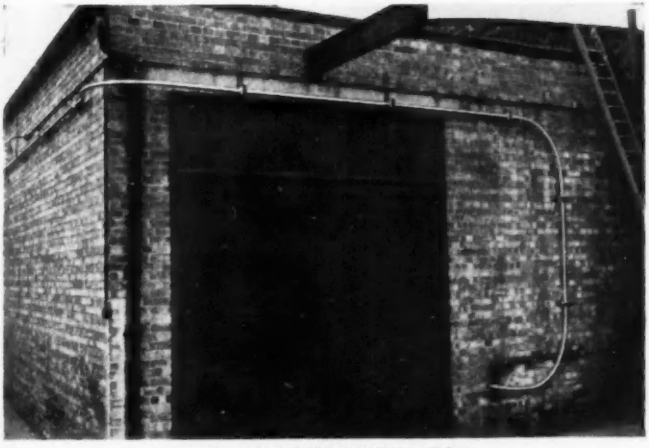

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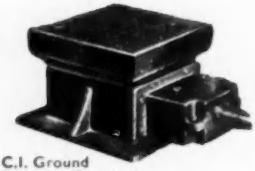
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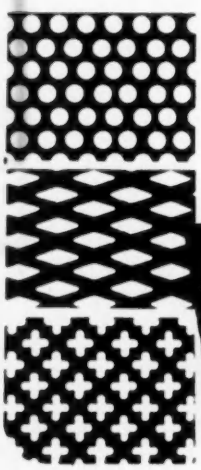

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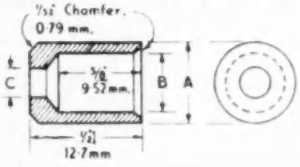

SIZE	A	B	C
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2	·354" 9 mm	·250" 6·35 mm	·140" 3·57 mm
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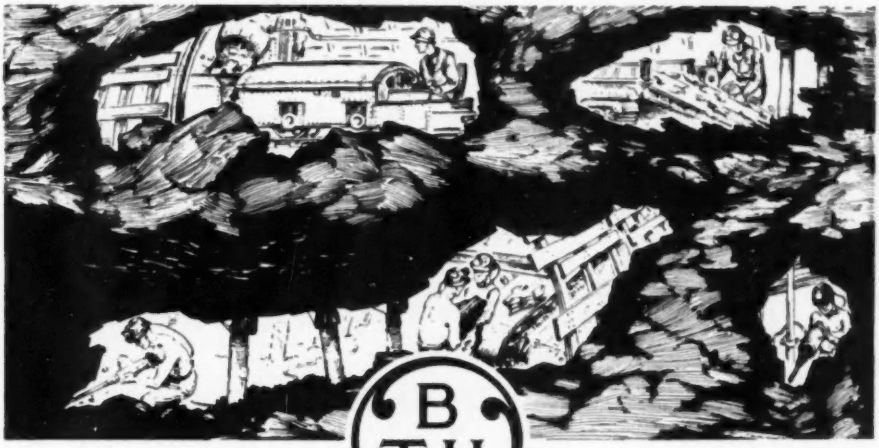

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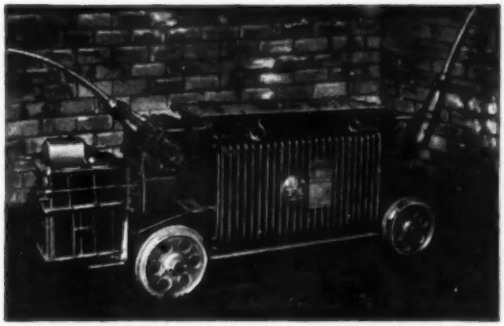
From important substations down to small portable units, BTH can supply transformers which will give years of trouble-free service. Rigid control of raw materials—quality of design—soundness of mechanical construction, are but a few of the contributing factors which have made BTH transformers popular in mining fields all over the world. BTH have been installing equipment in mines for half a century, and one reason for their world-wide reputation is the extensive research undertaken into the requirements of the mining industry. Backed by unrivalled manufacturing resources, BTH is today taking a leading part in the supply of equipment for reconstruction and modernisation schemes both in this country and abroad.



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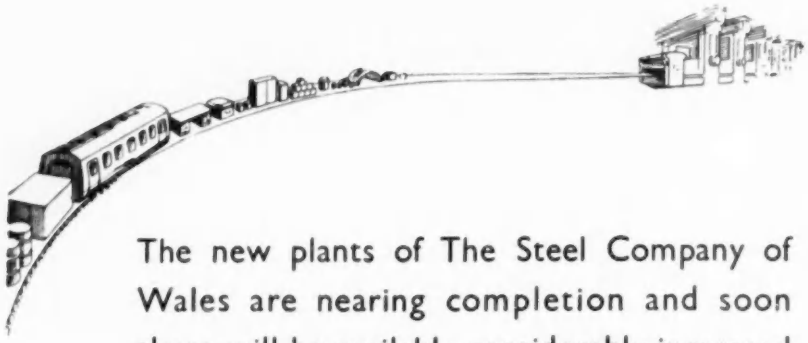

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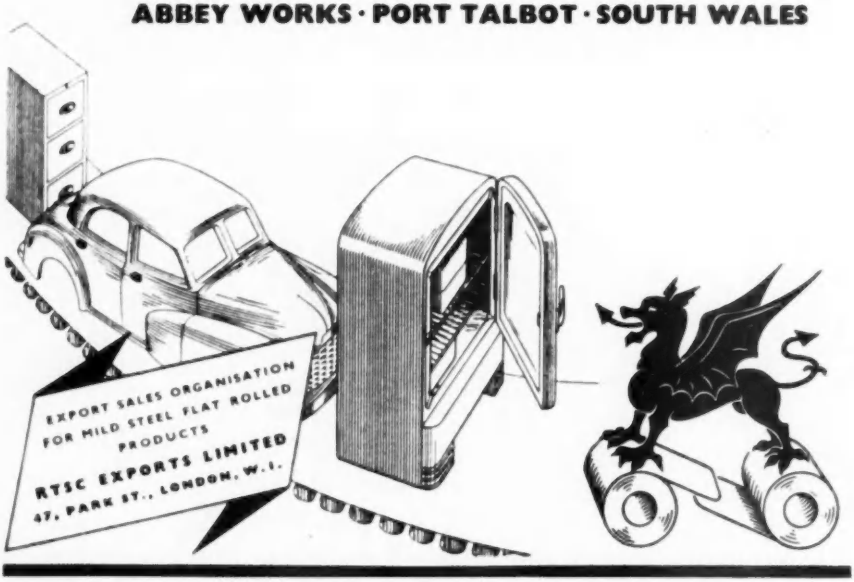
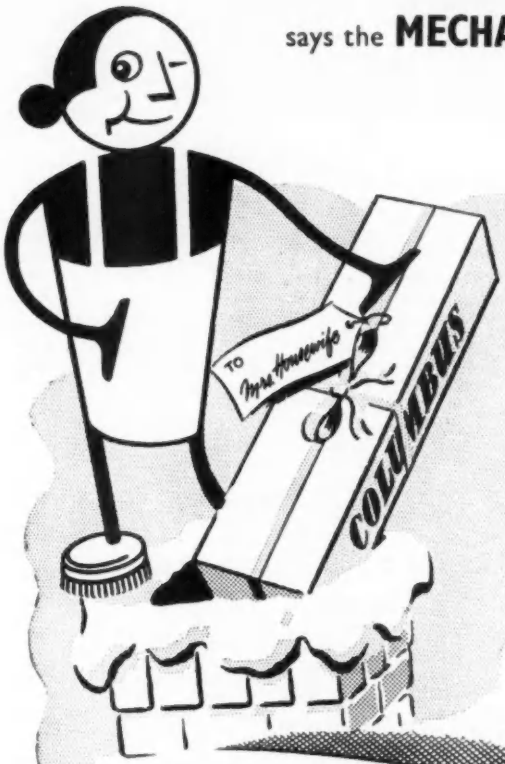


I'm Father Christmas

says the MECHANICAL CHARWOMAN



The sales possibilities of Columbus, the "Mechanical Charwoman," are tremendous all the year round . . . but at Christmas-time, when the public purse is open, they are intensified.

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The Mechanical Charwoman

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PRICES from **£32 10 0** to **£58** (plus Purchase Tax), according to requirements.

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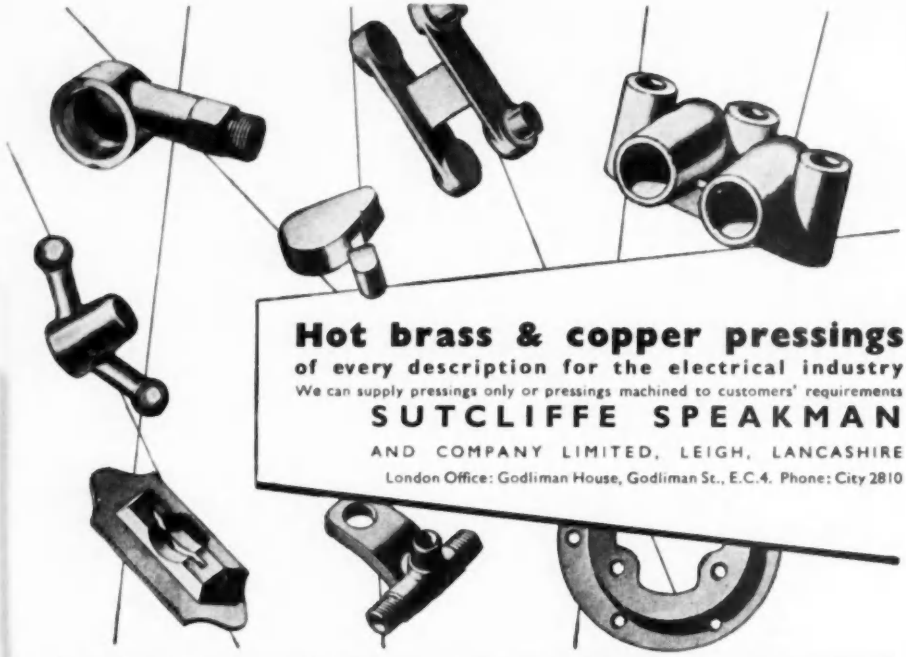

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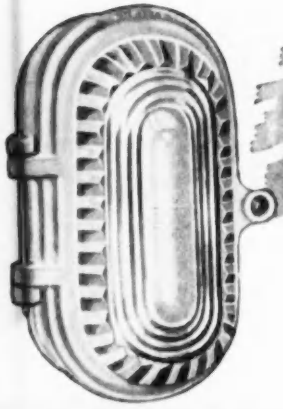

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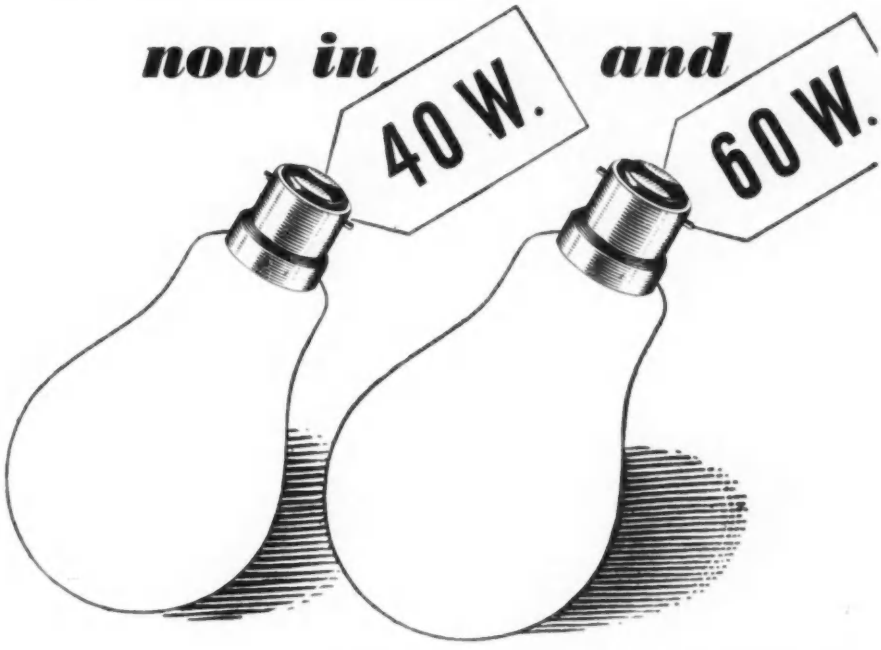
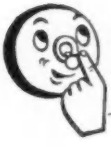
"WHITELIGHT"

now in 40W. and 60W.



Yes, you can now have Crompton coiled-coil 'Whitelight' lamps in 40W and 60W sizes at 1/7*d.* each, plus 5*d.* Purchase Tax. These new sizes are introduced following the outstanding success of the 100W size. Make sure you are ready to meet the demand! Available for 200/260 volts (10volt steps)



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Smooth control.

Linear scale, various markings.

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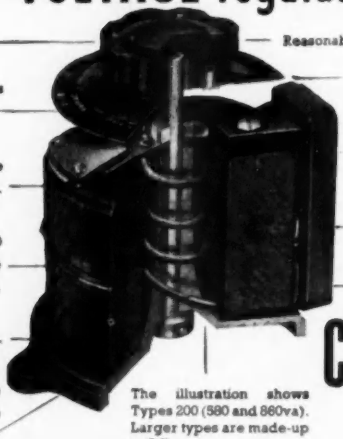

The illustration shows Types 200 (580 and 860va). Larger types are made-up to 7 Kva.

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Single or duplex voltage outputs. (Type 100 RM 2B)

Supplied with or without screen.

Ring-type laminated core.

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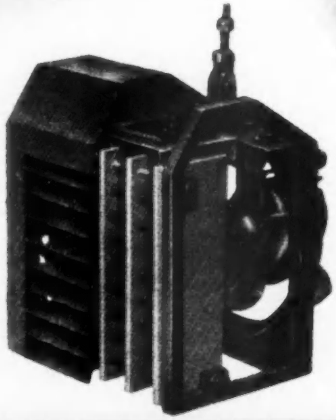
Made in 3 sizes 3, 5 and 10K



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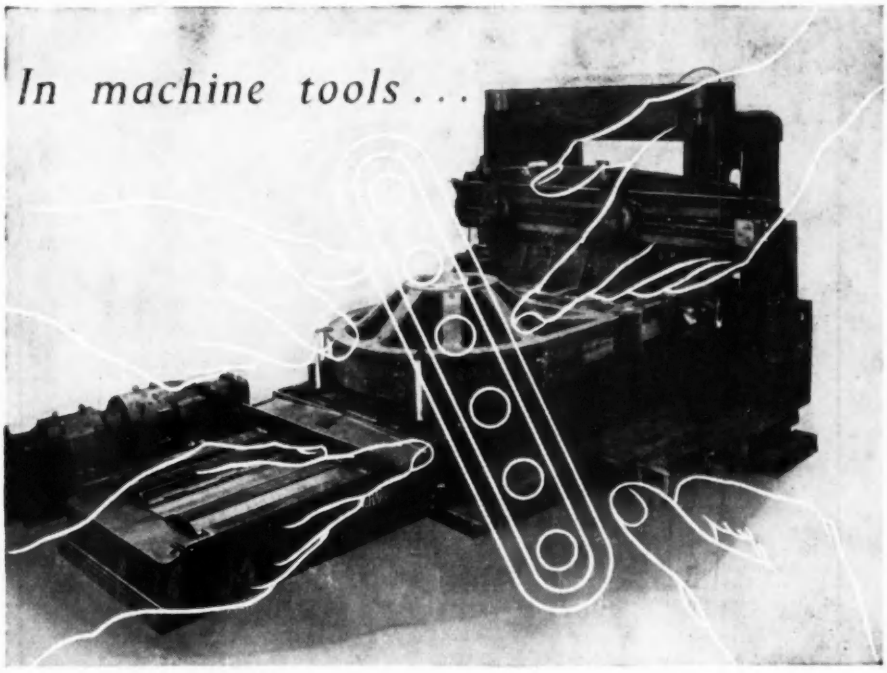

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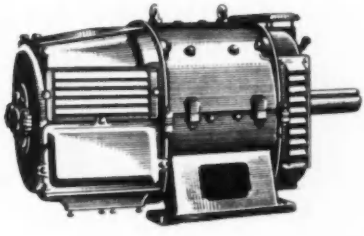
Even in the up-to-date production shop there is room for reducing time-wasting manual labour by thoughtfully applied electrical drives. In the M-V Motor Department are engineers who really understand the electrical problems of the machine-tool industry and their advice is available at the drawing board stage for new machines or on the conversion of existing equipment.

A typical Metrovick Type "Q" Direct Current Motor.



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Handsome Swan Brand Electric Iron makes easier, cheaper ironing. Super model with bevelled aluminium soleplate and six-position heat control. Heat-insulated handle. Complete with 3-core flex. In a choice of finishes—chromium plated or vitreous enamelled cream or green. Price 39/6.

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ELECTRICAL TIMES

Vol. 118 No. 3083 THURSDAY, 7 DECEMBER, 1950

PUBLISHED EVERY THURSDAY

SIXTIETH YEAR OF PUBLICATION

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OUR READERS' VIEWS 906
ELECTRONIC COMPUTORS 907
MAINTENANCE METHODS—No. 5 908
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G.E.C.

MOBILE RECTIFIER SUB-STATIONS

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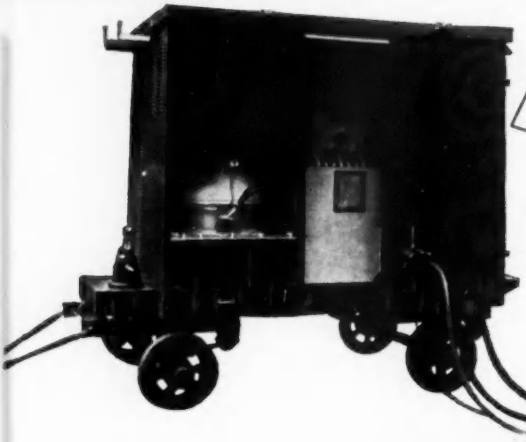
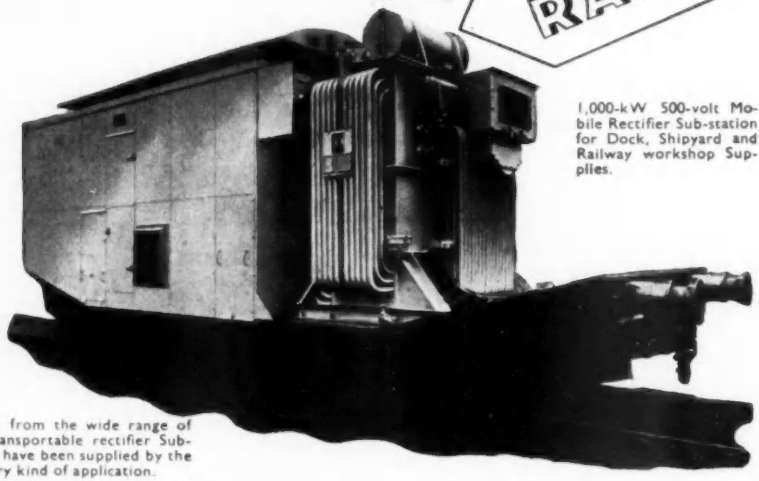


100-kW Mobile Unit giving a 220-volt D.C. two-wire supply, or alternatively, 50 kW at 100 volts.

FOR RAIL



1,000-kW 500-volt Mobile Rectifier Sub-station for Dock, Shipyard and Railway workshop Supplies.

Two examples from the wide range of mobile and transportable rectifier Sub-stations which have been supplied by the G.E.C. for every kind of application.

WRITE for Technical Descriptions Nos. 353 and 373.

THE GENERAL ELECTRIC CO., LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

Editorial

SECOND YEAR'S REPORT

THE second B.E.A. report published this week bears a close likeness to its forerunner. In bulk it is smaller, principally by reason of the omission of the historical section and by some pruning of exuberance of style. Unfortunately in the process some useful features have been discarded, such as the table of declared voltages which was a feature of the Commissioners' returns for so many years. The tables of accounts follow closely those of former years, but in the engineering section there has been a much needed improvement in the information published, particularly in the realm of transmission. We are thankful also for the inclusion of an index for which we pleaded in our comments on the first report. There is still room for improvement, however, in co-ordination within the report, particularly between certain tables reproduced in the main body and those in the voluminous section at the end. Thus in one place we learn that units sold to farms have increased by 19 per cent., but later figures show that sales under farming tariffs are 30 per cent. higher, and one is left to guess at the explanation. The discrepancy in other figures is less remarkable but it is all very puzzling.

LARGER SETS NEEDED

OVER any B.E.A. report there must loom the spectre of plant shortage, but need it have been dealt with at such length as in the general review? Nevertheless the picture is certainly a black one, and the day of power plenty is ever receding to the horizon. Even for the year 1952-53 the current estimate of plant shortage still remains as high as 1,702 MW. In no sense therefore can the B.E.A. be accused of exaggeration in calling for an annual programme of 1,800 MW. Against this formidable figure must be set the B.E.A. programme up to and including 1954, with its average size of set of 45 MW. It is clear that if the annual intake of new plant is to approach the suggested figure, then the B.E.A.'s views on the size of generating sets must be drastically revised, and no longer can the 30 MW unit be considered as adequate for modern conditions. The 100 MW, 3,000 r.p.m. set with 830 klb/hr boilers at 1,500 lb/sq in. planned for Castle Donington is a sound step, but this is in the nature of an experimental installation; it is only when 100 MW becomes a bread and butter rating as 60 MW is today that the attack on plant shortage is likely to meet success.

FREELANCE WIREMEN

NO MATTER what differences of opinion may normally exist between contractors and Area Boards, the subject upon which they will always see eye to eye is the free-lance or spare-time wireman. Nothing short of further curtailment of the liberty of the subject will ever prevent the home handyman from tinkering with his own wiring system, but both contractors and Boards can at least comfort themselves with the thought that most of these jobs would otherwise never get done at all, so that they are not losing much business—except that the home handyman frequently buys his materials at the chain stores. The free-lance who undertakes wiring jobs in his spare time is, however, a very different proposition and, as reported elsewhere in this issue, is causing both parties in the South Wales area no little concern, since he can easily undercut the keenest price, having no overhead expenses. While it is difficult not to sympathise with the enterprising wireman who is prepared to sacrifice his leisure hours to earn a little extra income, there is little doubt that much shoddy work—for which the customer has

little or no redress—is carried out in this manner. All the same, we feel that it is going to be a difficult matter for even the Board and contractors in combination to stamp out the practice. Even if wholesale witch-hunts reveal the identity of the "pirates," unless they have stolen their materials they have done nothing illegal, and unless they are in competition with their employers, their conduct is not even unethical.

BOTTLENECK ON PRODUCTION

A FREQUENT theme in both electrical and political circles is the need for more power in industry in order to raise productivity, and such discussions are usually reinforced by comparative figures of electrical consumption per worker in the U.S. and in this country. All too often there is an implication that our lower power usage is the responsibility of the supply industry, and it is the shortage of generating capacity that is holding back the rapid growth in the workers' elbow power for which we all hope. The real limitation, however, has nothing to do with electricity; it is the slow rate of capital development within industry itself. It is not enough just to provide additional power, the machines to use it are equally necessary and their capital cost may be several hundred times the value of the few electric motors which supply the power. It is this vast capital demand which is the real bottleneck to greater usage of electricity, and with the present limitation on capital expenditure, combined with the high rate of taxation, there is little likelihood of such expansion of industrial machinery outpacing the growth of generating capacity.

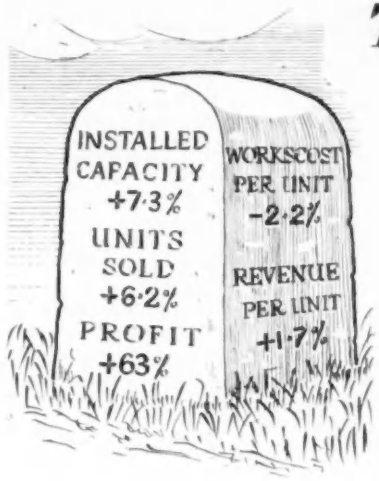
SLIPPING POWER

INTEREST in asynchronous generators has noticeably revived lately, reminding many engineers of the study of their possibilities which was made in the early 'twenties. The reason for this reawakening can be found in the present power-supply difficulties. Induction generators are readily practicable in the few hundred kilowatt ratings suitable for absorbing the surplus steam energy available in many factories, and further, it is possible to work them in parallel with the public supply without the switching problems that complicate such application of synchronous machines. The dependance of the induction generator on an external source of excitation is at once its strength and its weakness, causing it to take a lagging current from the system it parallels, but preventing it from feeding back when that larger network is de-energised. Many of the attractive properties of the machine are more apparent in theory than realisable in practice, but on balance a preliminary case has been made out for the industrial application of this type of machine. Electricity Boards have not always been helpful about such "loads," but while they cannot promise an early end to appeals for power economy, it is incumbent upon them to take a broad view of schemes involving induction generators which may reduce the kW demand.

BATTLE OF COMPLIMENTS

IN discussing a technical paper, the average engineer always seeks to tell the author how much he appreciates his industry in writing it. Such courteousness is, of course, often a prelude to allegations that some considerable part of the paper is in error. Since such preliminary votes of thanks are time-wasters, however deep rooted and sincere, I.E.E. chairmen have for long explicitly discouraged them, pointing out the existence of an official thanker whose eloquence is to end the proceedings. This session the debaters seem to have overtaken their chairmen. Equally explicitly they are regretting their inability to thank the author—and then, in fine style, they are commending some section of his paper (not the part they intend discussing!) for some outstanding characteristic they have perceived in it. We look forward to further developments in this battle of compliments, in which both sides are proving worthy contestants.

Meteor



The Second Milestone

B.E.A. Report 1949-50 marks a period of consolidation after the changes of the former year

THE second report and statement of accounts, which the British Electricity Authority published yesterday, covers the period ending March 31, 1950, and is a less bulky and more orderly arranged document than its elder brother, since much that was of purely historical interest and necessary as "first-time" background has been eliminated, while the remaining sections have been rearranged.

A general review of the complete picture occupies the first fifteen pages and takes the place of the summary which, in the previous issue, was tucked away between welfare and accounts. Generation and transmission are then accorded pride of place for the next two chapters, and are followed by commercial operations, employment and staff relations, after which come administration, finance and accounts, thus concluding the report proper in 179 pages as against 245 for the previous document. As before, there are 46 appendices.

Engineering . . .

ANOTHER year of endeavour has succeeded in adding some 939 MW of installed capacity to the Authority's system making a total installed capacity of 13,783 MW with a total output capacity of 12,337 MW. Although the rate of installation improved considerably over the 1948 figure, the planned rate was still not achieved and a total of 2,672 MW remains outstanding from the 1946-49 programmes. It should however be noted that a considerable amount of plant (65·7 MW) was shut down or derated during the year, thus making the actual figure for new plant installed 1,005 MW. This new plant comprised three new stations: Walsall (Midlands Division), Staythorpe (East Midlands Division) and Littlebrook B (S.E. Division), together with various extensions.

All the increase in output capacity from 11,554 MW at March 31, 1949 to 12,337 MW at March 31, 1950 took place due to extensions at steam stations, the capacity of the i.c. and hydro stations remaining constant at 236 MW.

Of the 908 steam-driven generating sets owned by the Authority at March 31, 1950, 327 representing 11·6% of the installed capacity were over 25 years old, and 458 representing 10·5% of the total capacity were each of less than 8,000 kW rating.

Plant Shortage

In the winter of 1949-50 the shortage of generating capacity at the time of maximum demand was estimated at 1,518 MW as compared with only 521 MW the previous winter. This was mainly due to the severe weather encountered. If there had been no load-spreading it is estimated that the demand might have exceeded the installed capacity by 2,140 MW. Revised estimates have been made of future deficiencies and indicate a shortage of 1,889 MW in 1950-51; 1,725 MW in 1951-52, and 1,702 MW in 1952-53 in the event of the winter being extremely cold. The output capacity of plant commissioned in 1946 was 307 MW; in 1947, 340 MW; in 1948, 566 MW; and in 1949, 703 MW. Reduction of capacity due to breakdown and other causes, were 11·4% for 1950 as compared with 12·1 in 1949.

Advanced Planning

The new plant capacity, approved for the programme years 1953-54 comprises eight new stations, extensions to 16 stations built since

TABLE 1. EFFICIENCY OF STEAM STATIONS 1949-50
Figures refer to the group of stations in each efficiency range.

Overall Average Thermal Efficiency for Year	Installed Capacity	kWh Output	*1948/49 Output*
%	% of Total	% of Total	% of Total
26 and over	9·6	13·4	9·5
24 to 25·99 ...	15·0	21·1	15·9
22 to 23·99 ...	15·9	17·8	26·2
20 to 21·99 ...	19·4	22·1	24·8
18 to 19·99 ...	16·6	14·2	13·9
16 to 17·99 ...	8·4	5·9	4·0
14 to 15·99 ...	5·2	2·6	2·4
12 to 13·99 ...	3·5	1·3	1·7
10 to 11·99 ...	4·3	1·2	1·2
Under 10 ...	2·1	0·4	0·4

the war and extensions to seven pre-war stations. The need to make use of all plant that is physically capable of being run, makes it generally impracticable to replace with larger units, obsolete and efficient machines and boilers at pre-war stations. A further major problem is the difficulty of obtaining suitable sites, the amount of paper-work and information required by local and other interested bodies alone, making it essential to plan for construction at least six years ahead.

Despite the efforts of the Authority, the cost of construction of buildings and plant continues to rise, and the price per kW is estimated to be in excess of £50. Building and co-ordination has now become the responsibility of the Authority which took over progressing of civil engineering work from the Ministry of Works on April 1, 1949 and the progressing of plant production from the Ministry of Supply on June 1, 1949. Allocation of steel and timber within the industry was taken over from the Ministry of Fuel and Power by the Authority on June 1, 1949.

Generating Plant Design

Considerable progress was made in standardisation of plant and layout. A major portion of the new plant on order will be of the unit type, using a single boiler per turbo-alternator, and standard conditions will apply to a large number of sets in the 1953-55 programme. Thus out of the 391,500 kW of plant operating at pressures up to 600 lb/sq in. programmed, 300,000 kW (77%) will be standard sets and of the 1,662,500 kW of plant operating at pressures up to 900 lb/sq in., 1,560,000 (94%) will be standard units. The non-standard sets (which include duplicates of existing sets for the development of stations begun before standardisation) also include several units operating at advanced conditions of pressure and temperature.

Apart from the sets themselves, work is to be started on the preparation of standard specifications for boilers, turbines, condensers, evaporators, de-aerators and feed heaters, feed pumps, alternators and their associated transformers, switchgear, etc.

An interesting station using steam at high pressure and temperature is to be erected at Castle Donington. The turbo-alternators will be rated at 100,000 kW and each will be supplied with steam from a single boiler capable of an output of 830,000 lb/hr, at a pressure of 1,500 lb/sq in., 1,050° F. The machines will run at 3,000 r.p.m.

TABLE 2. OUTPUT FROM GENERATING STATIONS 1949-50 GROUPED ACCORDING TO DIVISION
(Thousands of units of electricity)

Generation Division	Maximum Output Capacity, Mar. 31; 50 MW	% Increase on 1949	Generated by fired Steam Plant	Total Generated including I.C. and hydro	Used in Stations	Sent out from Stations	% Increase on 1949	Works Cost/ Unit s.o.
London ...	2,408	1·2	9,074,026	9,074,503	500,333	8,574,170	0·3	0·5514d.
South Eastern	656	29·2	1,994,024	2,002,914	129,574	1,873,340	27·2	0·5656d.
Southern ...	396	nil	1,351,552	1,358,235	73,298	1,284,937	4·2	0·6088d.
S. Western ...	488	nil	1,810,047	1,828,401	109,446	1,718,955	10·1	0·5710d.
Eastern ...	672	18·5	2,232,851	2,237,633	149,514	2,088,119	26·5	0·5611d.
E. Midlands	903	16·1	3,301,700	3,301,980	187,337	3,114,643	9·2	0·4471d.
Midlands ...	1,366	10·3	5,740,292	5,741,362	382,464	5,358,898	13·7	0·4454d.
South Wales	554	0·5	2,787,643	2,802,130	184,170	2,617,960	−3·0	0·4097d.
M. & N. Wales	574*	−1·9	2,487,463	2,585,099	151,254	2,433,845	−1·9	0·4931d.
Yorkshire ...	1,305	6·5	5,931,255	5,932,046	335,278	5,596,768	4·5	0·4052d.
North Eastern	600	1·5	2,851,792	2,907,114	171,611	2,735,503	7·4	0·4310d.
North Western	1,557	12·4	5,943,222	5,945,843	306,867	5,638,976	8·0	0·4822d.
S.E. Scotland	186	−0·5	859,496	859,496	40,936	818,560	2·0	0·5015d.
S.W. Scotland	674	3·6	2,264,109	2,561,879	112,607	2,449,272	0·3	0·4806d.
Totals ...	12,337	6·7	46,629,472	49,138,635	2,834,689	46,303,946	6·4	0·4865d.
% of Total Generated			98·96	100	5·77	94·23		

* *Port Sunlight, included last year as controlled by the Central Authority, is no longer counted.*

Investigations are also proceeding into the economic and technical problems associated with high-temperature, large-capacity reheat turbines.

Transmission

At March 31, 1950, the Grid system comprised some 5,424 route miles (7,612 circuit-miles) of lines and cables. The installation includes 3,710 route miles of 132 kV o.h. lines; 43 route miles of 132 kV underground cables; 1,257 route miles of 66 kV and lower o.h. lines and 414 route miles of 66 kV and lower cable. Net increases during the year were 54 route miles at 132 kV and 67 route miles at 66 kV and less.

Work continued on the construction of 41 miles of single-circuit 132 kV o.h. line designed for ultimate operation at 275 kV between Staythorpe and West Melton. Major works put in hand during the year included the provision for 292 route-miles of 132 kV lines and cables.

Extensive reinforcement of the network is needed, due to the rapid growth of load, and consultation and co-operation is maintained with the Area Boards to secure the fullest integration of the main transmission and distribution systems to ensure the maximum economy. The approximate cost of all transmission schemes approved during the year, including reinforcement, was £15,784,800.

Engineering.—Rate of plant installation improves, but demand still outstrips supply . . . Majority of new sets to conform to standard conditions . . . Extensive grid reinforcement needed to cope with load increase . . . Impulse testing of transformers now generally applied . . . Cable development for high voltages actively encouraged . . . Grid operation and stability still critical due to overload

The report also envisages that maintenance of the existing network (including cable replacement) will soon become a significant item.

Switchgear and Transformers

Substantial orders for 2,500 MVA and 3,500 MVA 132 kV switchgear have been placed, and high-speed 2,500 MVA designs are now in service. An unusual design for a 132 kV indoor substation, where the busbars and greater part of the equipment was installed in one chamber instead of being separated into different compartments was well in hand.

On the transformer side, impulse testing was being applied to one in fifteen transformers before they went into service. Preliminary discussions had taken place with manufacturers regarding the design of 275/132 kV auto-transformers of 120, 180 and 240 MVA

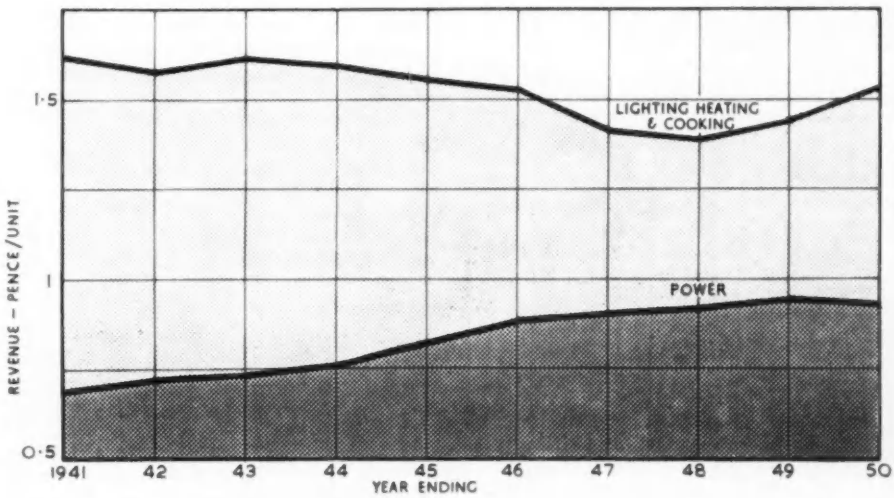


FIG 1. CHANGES IN REVENUE FOR THE LAST TEN YEARS

TABLE 3. GRID TRANSMISSION
Summary of Statistics

Quantity	March, 1950	March, 1949	Change
Total installed capacity (MW)	13,784	12,845	+939
Number of stations	293	297	−4
Capacity of 132 kV grid transformers (MVA)	11,722	10,925	+697
Capacity of 66 kV and lower voltage grid transformers (MVA)	3,658	3,950	−292
Route-miles of 132 kV o.h. lines	3,710	3,663	+47
Route-miles of 66 kV and lower voltage o.h. lines	1,257	1,266	−9
Route-miles of 132 kV underground cables	43	36	+7
Route-miles of 66 kV and lower voltage underground cables	414	238	+176

capacity, and of 275/11 kV generator transformers for 120 MVA capacity. Although these larger sizes can be built as 3-phase units, a limiting factor was the weight due to the loading on roads.

By agreement with B.E.A.M.A. higher quality sheet steel was to be used in the manufacture of large transformers, which should result in a saving in iron loss of about 10%.

Transformer performance had been good. With some 800 transformers on the network, there were during the year only 54 breakdowns involving isolation of a transformer. These comprised 8 winding faults (one due to lightning), 17 electrical breakdowns in tap-changing equipment, and 29 mechanical or control-circuit faults in tap-changers.

TABLE 4.
TECHNICAL DETAILS AND COSTS OF GENERATION AT STEAM STATIONS

Item	Units	1949-50	1948-49	% Change
Maximum output capacity, end of year	MW	12,101	11,318	+6·9
Electricity generated	kWh x 10⁶	48,632	45,637	+6·7
Electricity used in stations	kWh x 10⁶	2,827	2,652	+6·6
Electricity sent out	kWh x 10⁶	45,805	42,985	+6·6
Electricity supplied from fuels	kWh x 10⁶	45,802	42,981	+6·6
Average calorific value of fuels	B.Th.U. 16	10,898	10,898	0
Average delivered price of fuel	d. ton	586·7	598·3	−1·9
Fuel consumed for generation	tons x 10³	30,011	28,399	+5·7
Fuel consumed for generation	lb kWh s.o.	1·468	1·480	−0·8
Overall average thermal efficiency (sent out basis)	%	21·33	21·15	+0·9
Cost kWh sent out				
Fuel	d.	0·3845	0·3953	−2·6
Fuel handling	d.	0·0233	0·0241	−3·3
Oil, water, stores	d.	0·0038	0·0039	−2·6
Operation, salaries, wages	d.	0·0327	0·0326	+0·3
Repairs and maintenance	d.	0·0429	0·0422	+1·7
Total works cost	d.	0·4872	0·4981	−2·2

Lines and Cables

During the year under review, a further 33 kV submarine cable was successfully laid between the mainland and the Isle of Wight and on the e.h.t. side high-pressure gas cables are being increasingly used. Braehead power station will be connected to Govan and Haggs Road substations by 5,600 yd. of double circuit 132 kV cable with a continuous rating of 120 MVA, and 4,600 yd. of cable at 90,000 kVA. Both cables are pressurised with nitrogen at 200 lb/sq in. Consultations have also been held between the Board and the manufacturers on the design of 275 kV cable and accessories.

Protection of steel work from corrosion has been further investigated and trials are being carried out with sprayed aluminium. An improved design of tower for 132 kV lines has been adopted as standard, and preliminary designs of towers for 275, 380/400 kV have been prepared.

A slight decrease in the fault rate on the Grid is reported, the number of faults having fallen from 723 in 1948-49, to 660 in 1949-50. The fault clearance rate however declined, 92·5% clearing correctly as against 92·9% in 1948-49. This was not unexpected as the statistics now include power station switchgear (much of which is of old or obsolete design) as well as the main Grid switchgear.

The Authority intends to take all possible steps to achieve the maximum degree of standardisation of transmission and distribution equipment, and consideration is to be given to the production of technical specifications for transformers, switchgear, cables, overhead lines and meters, which will then be used uniformly for all such equipment purchased by the Authority and by the Area Boards.

The overhead transmission line at Leatherhead was brought into operation and tests covering the range 250-300 kV were carried out. At Croydon, work continued on the effects of humid and polluted atmospheres on insulators, and also on methods to reduce the water-spray from cooling towers.

Operation

Control of the Grid remained exceedingly difficult during the year, and although no major disruption occurred there were occasions when a line-fault would have caused extensive failure of supply. Load shedding was necessary on 124 occasions compared with 74 and 79 in 1947-48 and 1948-49 respectively. Due to heavy overhaul commitments, load had also to be shed on 45 occasions between April and

October. As in previous years, in order to make more plant available to meet the greater winter needs, as much essential maintenance and overhaul of generating plant as possible was carried out in the period April to October, inclusive, much of the work being done during the week-ends.

The overall thermal efficiency continued to rise, being 21·33% as compared with 20·86% and 21·15% for previous years.

Commercial.—Units sold increased 6.2% to 41,479 millions . . . Consumers connected totalled 12,634,267, of which 11,122,545 were domestic . . . A further 9,635 farms supplied . . . £1.6 million balance from Clow surcharge returned to consumers . . . No comprehensive scheme for standard system of supply . . . Interchangeable hire-purchase and credit sales scheme introduced

Commercial . . .

A POTENTIAL peak requirement of 12,282 MW was produced by the cold spell at the end of last January, when the average mid-day temperatures for the country fell to nearly 13° F below normal. Otherwise, weather during the year to March 31, covered by the report, was extremely favourable towards the B.E.A., there being a generally inclement summer, and an exceptionally mild winter, with consequently comparatively little load shedding. The peak referred to above was 1,745 MW higher than the figure for 1948-49.

The total number of consumers connected has continued to increase, a further 452,000 being added during 1949-50, compared with 466,000 in 1948-49, bringing the total at March 31, to 12,634,267. It is considered that the slightly lower number of new connections last year was chiefly due to the fact that 66,631 fewer houses were built during the period. Domestic consumers at March 31 last numbered 11,122,545.

Units sold to all consumers during the year covered by the report amounted to 41,479 millions, an increase of 6·2%. Since the publication of the Authority's First Report, the classification of sales to various types of consumers has been revised. Somewhat surprisingly, it is shown that during the year to March 31 last, sales to domestic consumers, totalling 13,460 million units, was an increase of only 1·9%, and here again, the blame is laid on reduced house building. Industrial consumers took 20,784 million units, an increase of 8%, while supplies to farms, amounting to 372 million units, were also 19·6% up.

Lighting Consumption

The largest increased consumption during the year under review was in respect of public lighting (32·8%), which accounted for 360 million units, chiefly due to the more general restoration of later night lighting. Sales for rail traction purposes again increased, although at a slightly lower rate, due partly to improved traffic conditions and to new services, but street traction supplies declined a further 26 million units, to 546 millions, owing to the closing down of certain tramway systems.

During the year the Authority supplied directly to the Railway Executive a total over 676 million units—53 million above the 1948-49 figure. This included 555 million units to the Southern Region, of which 286 millions were at 25 cycles. At the end of the year, the Authority awaited a decision of the Railway Executive with regard to the scheme for the change-over of the non-standard portions of the S.R. system to 50 cycle operation. The year was, of course, notable for the inauguration of the Liverpool Street—Shenfield electrified system. Equipment is now being installed to supply electricity for the Manchester-Sheffield railway electrification scheme.

In regard to power supplies, the Authority is able, by arrangement, to augment its own generating capacity by taking electricity from the North of Scotland Hydro-Electric Board, and a total of 45 million units were taken from this source during the year. The arrangements made for the purchase of electricity from the owners of private power stations, including the Ford Motor Co. at Dagenham, the British Transport Commission and certain Government Departments, were also continued or

TABLE 5. ENERGY SALES COMPARED WITH 1948—1949

Area Board	Increase in Total Sales	Classification	Increase in Total Sales
	% of 1948/49		% of 1948/49
London	4·2	Lighting, flat rate	7·1
S. Eastern	6·4	Heating etc., flat rate	6·9
Southern	6·7	Domestic, 2-part	2·7
S. Western	5·0	Commercial, 2-part	8·8
Eastern	6·7	Farming	30·4
E. Midlands	7·8	Large power	7·7
Midlands	6·2	Public lighting	33
S. Wales	5·2	Traction	1·9
M. N. Wales	8·1	Total A.B. Sales	6·2
Yorkshire	6·6	Inter-Board Sales	—6·6
N. Eastern	7·2	B.E.A. Sales to railways	8·5
N. Western	4·1		
S.E. Scot.	7·3	Total sale of electricity	6·2
S.W. Scot.	1·7		

renewed where necessary. In fact, about 313 million units came from these sources.

Power requirements of the Area Boards from the Authority were all above the 1948-49 total, the largest increase being recorded for the South Eastern Board (13%), while the lowest was South West Scotland, for which a rise of only 3% was recorded.

The bulk supply tariff under which the Boards took their supplies from the Authority during 1949-50 were slightly amended, surcharges and discounts being halved, and the provision for service charges omitted. But further revision has been made in the tariff for the year 1950-51, to cover additional expenditure incurred by the Authority. The reasons for the additions are dealt with at some length in the report, and have already been given in our columns.

On the much criticised Clow surcharge, which operated during three months of the 1948-49 winter, it is noted that the exceptionally fine and warm weather prevailed during the following summer, when the rebates were in force. Thus, the units used by domestic consumers qualifying for rebate did not reach the totals anticipated, with the result that the Area Boards were left at the end of the rebate period with £1·6 million over. It was not practicable to give a further rebate in the immediately following period, and after consultation with the Minister of Fuel and Power, it was decided that each Area Board should give a further rebate during the summer of 1950, so as to exhaust the net outstanding balance.

Reference is made to various adjustments made by the Boards in the move towards more uniform rates of charges. And in connection with the simplification and standardisation of methods of charges, the Retail Tariff Committee had, by the end of the year, approached the stage at which a general report could be issued for consideration by the Boards.

TABLE 6. CONSOLIDATED ACCOUNTS 1949-50

	B.E.A. and Area Boards Consolidated Accounts	Central Authority Accounts
	£	£
Sales of electricity	207,347,707	127,743,159
Sales of steam	355,669	355,669
Rentals of meters, etc.	3,868,458	—
Income from public lighting maintenance	1,292,941	—
Surplus on contracting and sales of fittings	804,253	—
1949: £197,152,368	**213,669,028**	**128,098,828**
Deduct:		
Generation: works costs	93,736,529	93,736,529
Purchase of electricity from other sources	1,209,979	933,341
Main transmission: operation, repairs and maintenance	1,337,069	1,337,069
Distribution: Operation, repairs and maintenance	20,363,211	—
Rents, insurances, etc.	1,514,920	636,971
Payments in lieu of rates	11,819,826	4,979,615
Administration and general expenses	24,758,085	4,588,616
Changes of systems of supply (consumers' apparatus)	374,329	—
Depreciation of fixed assets	33,624,023	13,942,897
1949: £176,427,036	**188,737,971**	**120,154,938**
Consolidated Net Surplus from Trading: 1949: £20,725,332	**24,931,057**	**7,943,890**
Add:		
Income from subsidiary companies	67,633	67,633
Rents receivable and other miscellaneous income	722,589	39,949
1949: £643,482	**790,222**	**107,582**
1949: £21,368,814	**25,721,279**	**8,051,472**
Deduct:		
Interest	17,548,684	9,172,919
Financing expenses	309,359	172,326
Intangible assets: Amount written off "balance of consideration for undertakings acquired	700,000	700,000
Income tax and the profits tax	Nil	Nil
1949: 16,977,130	**18,558,043**	**10,045,245**
Consolidated Net Surplus for the year 1949: £4,391,684	**7,163,236**	**(—)1,993,773**
Deduct:		
Transfers to, less transfer from, Central Reserve Fund	—25,773	—
Transfers to area reserve funds	4,600,000	—
1949: £3,346,851	**4,574,227**	**(—)1,993,773**
Add:		
Transfer from central reserve fund	—	1,993,773
Balance for the year carried forward: 1949: £1,044,833	**£2,589,009**	—

Farm Supplies

Rural electrification is still being advanced by the Boards, in discharge of their duties, and, despite the many difficulties, 9,635 farms were connected during the year—over a thousand more than in 1948-49—bringing the total supplied at March 31 last, to 99,365. The quarter ended December 31 proved to be the best period for this purpose, a total of 3,057 being connected in the three months.. On further plans for rural electrification, it is stated that informed consideration of the financial aspects is all the more important because the economic return on the schemes as a whole is so doubtful.

On the question of standardised systems of supply, it is recorded that, although nearly 47,000 d.c. consumers, and more than 365,000 on non-standard a.c. systems, had their supplies changed over to the standard 240 V a.c., it is impracticable for the time being to undertake any comprehensive scheme in this direction. In 1946 it was estimated that to do so, the cost would amount to £22·7 millions, but obviously, the figure is now substantially higher, and likely to increase each year.

Turning to the contracting and trading side of the supply industry, it is stated that the

general policy of the Area Boards on the hire-purchase and credit sale of electrical appliances was co-ordinated, and these facilities are now available through the service centres of each Board. The pre-war hire methods have now been almost wholly replaced. It is now possible for a consumer, moving from the area of one Board to that of another, to retain an appliance and make the hire-purchase or credit sale payment to his local Board. Similar interchange arrangements apply to guarantees and repair and maintenance contracts.

With the formation of the Utilisation Research Section of the Commercial Department, a number of projects are in hand. These include an investigation into the characteristics of the cooking load, and a comparison between costs of providing a supply of electricity to post-war and pre-war houses.

Personnel . . .

A CERTAIN amount of the material included in this section is, of necessity, repetitive, since it is essential to clarify the Authority's statutory obligations and to recapitulate the workings of the negotiating machinery

The number of persons employed at the end of the period was 170,500, of which 117,300 were manual workers and 53,200 in the engineering, administrative and clerical grades. This latter description is adopted throughout the report, in view of the complexities of exact definition, engineers no longer being graded separately. It is pointed out that of the grand total, 44,000 (or 26%) were employed by the Authority and the remaining 126,500 by the Area Boards. Eleven per cent of the total employees are women, this comparing with 10% given in the previous report.

Particulars are given of wage negotiations affecting manual workers, and the decisions regarding local excess payments being merged in the N.J.I.C. 1½d./hour award, with a short review of the temporary stoppages at various power stations. National Council decisions on shift workers' payments for Sunday and public holidays, and pre-vesting concessions, bonuses and co-partnership schemes are recorded.

For engineering staff, an account is given of the negotiations regarding classifications of Headquarters Division and Area Board staffs. Similar information is given regarding administrative and clerical grades, and the progress made by permanent schemes to replace interim grading and salary scales. It is pointed out that when the National Joint Committee for managerial grades is established, only 150 employees in the B.E.A. will be outside the scope of negotiating machinery.

Employees now total 170,500, of whom 117,300 are manual workers. . . . Women now account for 11 per cent. of total employed. . . . Accidents for year are higher, with 27 fatal accidents and 4,833 accidents involving more than 3 days' absence. . . . Falls cause over 20 per cent. of accidents, electricity less than 3½ per cent. . . . Over 600 men accepted for the graduate training scheme. . . .

Safety and Welfare

Matters which had been accepted in principle by the end of the year included the cessation of the use of methyl bromide for fire extinguishers, the use of wooden ladders in substations, and the use of low-voltage supply for portable apparatus in dangerous situations.

There were 19 fatal accidents in the Divisions (11 being contractors' men) and eight in the Area Boards; the respective non-fatal accidents involving more than three days' absence being 1,857 and 2,976. The accident frequency for the Divisions is given as 2·62 per 100,000 man-hours worked. Of the total accidents, it is pointed out that 21·3% were due to persons falling and only 3·4% caused by electricity. Particulars are given of work carried out to avoid accidents in coal bunkers, although it is admitted that falls of coal cause only a very small percentage of accidents.

Health

Under this heading is discussed *inter alia*, the appointment of part-time medical consultants to Areas, to undertake the study of occupational hazards and diseases, and some reference is made to the desirable precautions against asbestosis. A British Electricity Ambulance Centre was established in October, 1949, and already has over 1,000 members.

Welfare

Further steps have been taken to provide better amenities at power stations, and a survey has been made of workmen's camps to establish housing standards for contractors' men engaged on construction. Canteen and recreational facilities continue to expand, and a number of arts and crafts exhibitions have been held which will culminate in a national exhibition held in London early in 1951.

Education and Training

The graduate training scheme, described in the last report, had accepted over 600 men up to the end of March, 1950. Questions still under consideration include the training of junior clerical and administrative staff, and service centre staff, and the matter of educational incentives including financial assistance. Vacation courses, overseas students and interchange schemes with foreign supply authorities are also reviewed, as are the courses carried out at the residential training centre at Buxton, which at March, 1950, had received nearly 1,600 persons for courses. Reference is also made to the means used to keep employees informed, including *Power Pictorial* and *Giant Power*.

Administration.—Separate Contracts Department now relieves engineering staff. . . . Ownership of transmission lines agreed. . . . Information services developed. . . . Joint Committees discuss price questions with manufacturers

Administration . . .

MAIN changes since the last report have been the establishment of a separate Contracts' Department to relieve engineers of price negotiations, and the taking over of progressing of sites; and plant production and allocation of steel and timber, responsibilities previously held by separate Ministries. Other matters of general administration include the development of an internal audit system, and the co-relation of common services to Area Boards and corresponding Divisions.

Ownership of transmission lines has been agreed upon; the B.E.A. owning 132 kV lines, and Area Boards taking all lines at 33 kV and below. Lines operating at 66 kV may be allocated to the Authority if used for power-station interconnection, and to Boards if otherwise used.

Insurance

The variety of insurance arrangements existing before vesting, have been clarified, and a committee has been created through which individual policies are now negotiated, the committee itself dealing with practically the whole of the insurance market, a total of 51 companies.

Reference is made to the development of the Authority's information service, which includes a central library with some 5,000 volumes, an abstracting service issuing a weekly bulletin for general circulation, and a translating service.

A review is given of the superannuation scheme, which covers administrative, professional, technical, commercial and clerical employees. Membership is compulsory except for temporary staff, those under 20, and those already possessing pension rights protected under the Electricity Act. On the question of compensation for loss of employment, it is stated that 60 claims have been made.

Outside Relationships

Relationships with other organisations are dealt with in this section under two headings. It is pointed out that the Authority has continued its support of bodies such as E.D.A., E.A.W., E.R.A., E.I.B.A., and the B.E.P.C., and has become a member of several other associations.

On relations with manufacturers, a number of joint committees have been formed to discuss price questions with the main manufacturing groups. These committees are particularly concerned with terms and conditions for contracts, and standardisation. Some progress has been made, it is felt, towards inducing manufacturers to produce evidence of actual manufacturing costs, to be used as a basis for fixing fair prices on subsequent orders. Some agreement was reached on discounts to Area Boards for standard a.c. motors; on the use of the C.M.A. new standard 33 kV solid cables, and on farm wiring cables; and discounts and rebates on E.L.M.A. lamps.

The section concludes with a list of new Grid substation consents, a variation of the boundary of one Area Board (Congleton transfer) and a list of property transfers.

Finance . . .

DURING the year, certain outstanding questions regarding the transfer of assets as at vesting day were tidied up, but the five million pounds payable by the Authority to Municipalities had not been paid at the end of the financial year. A review of the accounts of local authority undertakings disclosed transactions inconsistent with relevant statutory provisions, which resulted in assets being diverted from vesting in the Authority. Most

cases were settled satisfactorily, but in 36 cases the Authority felt obliged to serve writs.

In transferring the reserves of former undertakings and liabilities into the Authority's account, liabilities exceeded assets by some £65 million and this constituted the balance of the consideration for transferred undertakings. The South East Scotland Board however, made representation asking for the free reserves on the books of former undertakings, which it claimed came from the distribution side, should be credited to the Board. The Authority was unable to concede this claim.

Seven composite companies did not exercise their right to require that the whole of their property should vest in the B.E.A. On the other hand, 25 non-statutory undertakings were transferred to Area Boards, involving a total compensation of £127,687.

The Second Year

During the second year the general arrangements of budgetary control described in the first report were continued and the system of comprehensive estimates was further developed with standard forms for use by Area Boards. Estimates for 1950-51 were, however, influenced by the Government's limit on capital expenditure. The capital allocation to the industry was divided as follows:

	£ million
Generation	54
Main transmission	5
Distribution	35
Maintenance repair	8
North of Scotland	14

In consequence of this restriction existing contracts were graded in an order of priority and the original Area Board's estimate of £58·3 million was reduced to the figure in the table above.

A new table of depreciation of plant has been prepared with which capital cost will be written off on the straight line method. It is interesting to note that generating plant is given a life of twenty-five years, not the pre-war twenty.

Taxation

Once again the B.E.A. will pay no income tax and is unlikely to do so for 1950-51 and possibly for some years thereafter, this being largely due to the initial allowances claimed in respect of capital expenditure. Accordingly, no taxation reserve has been created. Neither does liability for profits tax occur in the year 1949-50. In 1950-51 however, profits tax will probably be payable due to the initial allowances not being included in computing this liability. With regard to excess profits tax, the Authority complains that it is not entitled to allowances for terminal expenses in respect of deferred repairs and renewals. Representation has been made in the hope that the law will be amended in this respect.

In respect of compensation payable under the War Damage Act of 1949, the B.E.A. will receive a sum of £6,126,297 net after deducting contributions payable to the Authority and advances made to former undertakings. It has been decided that this sum should be retained by the Central Authority, and expenses incurred in restoring war damage by Electricity Boards should be charged to this account.

The payment in lieu of rates amounted to £11,250,000 for England and Wales, and £822,000 for Scotland. Apportionment between the Electricity Boards was made primarily on fixed assets, at March 31, 1949. Secondary apportionment was then made of the amount allocated, made up of two equal payments; one half on the basis adopted for 1948-49 and the

TABLE 7. FINANCIAL RESULTS OF EACH AREA BOARD

Area Board	Trading Revenue	Net Revenue from Trading	Other Income	Interest, Financing Expenses, etc.	Net Revenue	*Net Revenue*, 1948/49	Transfers to		Carried Forward
							Central Reserve Fund	Area Reserve Fund	
	£	£	£	£	£	£	£	£	£
London	30,552,341	2,712,357	183,435	994,702	1,901,090	1,144,724	312,000	850,000	739,090
South Eastern...	13,880,579	961,806	91,604	630,787	422,623	171,752	148,000	150,000	124,623
Southern ...	16 113,903	1,563,156	76,151	719,084	920,223	382,381	179,000	550,000	191,223
South Western ...	7,572,255	429,147	33,393	461,746	794	—106,487	—	—	794
Eastern	20,484,407	1,256,915	133,565	996,297	434,183	—355,249	—	—	434,183
East Midlands...	15,573,780	1,507,202	45,179	679,842	872,539	748,048	165,000	500,000	207,539
Midlands ...	19,974,776	1,489,172	55,000	846,790	697,382	628,241	215,000	300,000	182,382
South Wales ...	9,540,371	770,953	16,294	336,196	451,051	317,925	100,000	250,000	101,051
M. & N. Wales...	12,553,906	736,265	39,499	416,419	359,345	140,686	131,000	150,000	78,434
Yorkshire ...	18,975,697	2,031,233	47,051	747,597	1,330,687	486,623	201,000	950,000	179,687
North Eastern...	12,120,572	961,096	45,186	477,510	528,772	259,614	127,000	250,000	151,772
North Western	22,121,550	1,471,733	47,762	901,956	617,539	393,081	236,000	250,000	131,539
S.E. Scotland ...	4,585,918	613,820	11,449	158,330	466,939	408,888	49,000	400,000	17 939
S.W. Scotland...	10,218,154	442,312	13,050	301,510	153,852	378,606	105,000	—	48,852
Totals* ...	210,937,428	16,987,167	838,608	8,668,766	9,157,009	4,998,833	1,968,000	4,600,000	2,589,009

* *Excluding Inter-Board bulk supplies.*

Finance.—Overall surplus £7,163,236, increase of £2,771,547. . . . All area boards made surpluses, and all were higher than last year except South West Scotland. . . . Central authority's loss increased from £607,149 to £1,993,773. . . . Fixed assets rose from £468 million to £548 million. . . . Phenomenal increase in hire purchase sales from £1.6 million to £5.1 million.

other half in proportion to the surpluses of the twelve area boards, for the year ending March, 1949.

Trading Results

The consolidated net surplus for the second year amounted to £7,163,236 as compared with £4,391,684 in the first year. This increase was obtained as a result of revenue being up by £16·7 million with expenditure being increased by only £13·9 million. The average selling price per unit increased from 1·18 to 1·2d. for the current year. Rises of 0·1% in administration expenses were offset by a fall of a similar amount in works costs. One of the factors was the wage increase of 1½d. an hour to manual workers awarded in June, 1949. It is pointed out that the disproportionate increase in administration and general expenses was due to several factors, one being that the initial administrative organisation was not completed until the end of the first year, and consequently a full year's charge was first borne in 1949-50.

All Area Boards made profits, and with the exception of S.W. Scotland all showed increased surpluses; the combined figure being £9,157,009, against which must be set the Central Authority's loss of £1,993,773. This deficit was met by an allocation from the Central Reserve Fund, which received £1,968,000 from the Area Boards, so that the fund was reduced to £1,171,078. The total fixed assets of the B.E.A. at March 31, 1950 were £548 million, as shown in the following table, an increase of 17%. The total capital liabilities were £606·63 million. In addition £65·38 million were outstanding as temporary bank advances.

Balance Sheet	£ million
Fixed assets less depreciation	548·01
Interest in subsidiary companies	38·35
Current assets less current liabilities	39·36
Intangible assets	57·84
Total	683·56

Finally, dealing with the section of the report on contracting and sale of fittings, the outstanding feature is the phenomenal increase in hire purchase and similar sales from £1·6 million to £5·1 million in 1949-50, yet despite this substantial rise the net surplus showed a fall of 14%. It is particularly interesting to note that the value of work in hand has fallen by £327,942 compared with last year.

This concludes our review of the Central Authority's report. Next week we shall deal with the reports of the individual area boards and include a review of the salient features which this second year's trading reveals.

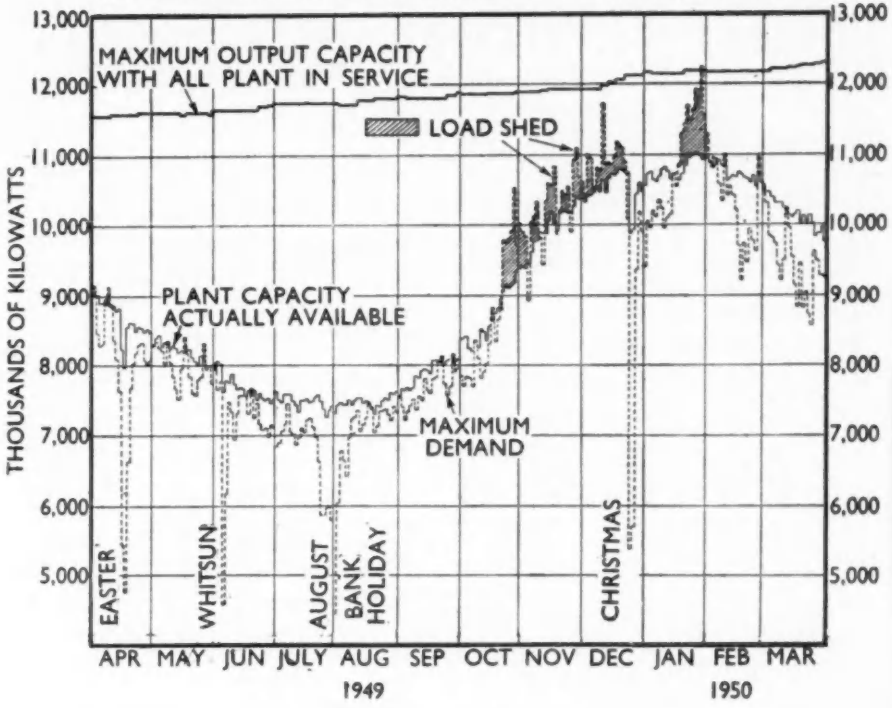
TABLE 8

ANALYSIS OF UNITS SOLD UNDER VARIOUS TARIFFS BY THE AREA BOARDS AND THE CENTRAL AUTHORITY.

THOUSANDS OF UNITS

	Flat Rates		Two-part								
	Lighting	Heating Cooking Water Heating & Small Power	Domestic	Commercial	Farming Tariffs	Large Power	Public Lighting	Traction	Total (Excluding Inter-Board Sales)	Sales to Other Area Boards	Total Sales by Area Boards
Area Boards											
London	242,793	302,585	1,406,267	554,233	288	1,245,012	72,049	94,433	3,917,660	948,542	4,866,202
S.E.	80,012	218,106	983,828	212,115	3,682	572,349	27,398	24,259	2,121,749	48,709	2,170,458
S.	83,446	228,206	914,174	264,380	11,986	894,465	21,347	17,023	2,435,027	59,152	2,494,179
S.W.	57,008	157,949	548,415	91,806	4,314	359,809	12,561	—	1,231,862	252	1,232,114
E.	90,433	282,914	1,430,531	249,740	19,350	1,305,815	28,641	129,249	3,536,673	7	3,536,680
E. Midlands	131,429	200,799	891,781	139,149	36,876	1,722,745	17,854	26,264	3,166,897	279	3,167,176
Midlands	180,803	381,033	1,018,112	78,761	11,479	2,557,637	19,597	53,502	4,301,224	25,329	4,326,553
S. Wales	72,474	183,276	259,283	26,889	6,635	1,807,281	13,988	9,966	2,381,842	252	2,382,094
M. & N. Wales	116,286	166,270	650,295	116,661	—	1,524,978	16,677	94,916	2,686,483	—	2,686,483
Yorkshire	179,791	284,860	1,054,249	90,716	6,909	2,623,224	28,279	129,962	4,397,995	1	4,397,996
N.E.	126,715	129,873	451,819	132,336	9,234	1,839,740	16,725	74,824	2,781,266	4,308	2,785,574
N.W.	208,362	355,321	1,321,838	145,699	11,179	2,483,229	38,986	66,272	4,630,886	11,704	4,642,590
S.E. Scotland	33,339	59,366	270,553	69,330	8,721	396,653	11,679	34,851	884,501	—	884,501
S.W. Scotland	16,715	58,698	686,554	311,158	13,052	1,211,653	34,581	—	2,332,411	—	2,332,411
Total Area Bds.	1,619,606	3,009,256	11,888,099	2,484,982	143,755	20,544,895	360,362	755,521	40,806,476	1,098,535	—
B.E.A. Sales to Railway Undertakers	—	—	—	—	—	—	—	675,757	675,757	—	—
TOTAL	1,619,606	3,009,256	11,888,099	2,484,982	143,755	20,544,895	360,362	1,431,278	41,482,233	—	—

FIG 2. PLANT CAPACITY AND DEMAND OVER THE PERIOD 1 APRIL 1949 to 31 MARCH 1950



The Report of the Minister of Fuel and Power

DURING the year, the Minister issued consents to the construction of five new stations and the extension of eleven existing stations, the aggregate capacity concerned being 1,191·5 MW.

Seven thousand one hundred and fifteen consents were issued for the erection of overhead lines, the local authority being afforded a hearing in five cases, and a number of applications for wayleaves were dealt with.

Special regulations permitted the use of arc-suppression coils at certain points on the South Western Board's system, and two applications for multiple neutral earthing on low voltage systems were approved, together with three high voltage systems. Thirty-six consents were issued to alterations in supply, of which 34 related to changes from non-standard to standard systems. Accident statistics include 18 fatal and 164 non-fatal accidents.

Certain relaxations were allowed on over-head line construction in five cases. There was one application for h.v. and l.v. circuits on the same pole, which was allowed.

Fifteen applications were made for approval of new or modified meters, and nine cases of disputes regarding accuracy of meters involved a total of twelve meters, eight of which were declared in proper order.

Matters dealt with in Part 2 of the report include appointments of Area Board chairmen.

Four chairmen whose appointments ended on December 31, 1949, were replaced by four others for a two years' period, and one part-time member of the Central Authority was reappointed for a further two years. Twelve of the Consultative Councils submitted to the Minister schemes for the appointment of district committees, and approval was given to each of these, which will be reviewed when experience has been gained.

Other matters dealt with are the capital investment programme, the transfer of property between Boards, confirmation of compulsory purchase orders and a list of statutory instruments issued during the year.

Our readers' views ...

Cooling Towers Overseas

WITHOUT having read the complete paper "A Contribution to the Theory of Natural Draught Cooling Towers," by B. Wood and P. Betts, which was reviewed in the ELECTRICAL TIMES for October 12, it appears to the writer that experience of practice in cooling water at maximum working temperatures is very essential in tower designs.

It is felt that natural draught towers are not the most suitable cooling arrangement for overseas requirements, as much higher atmospheric temperature conditions are generally met with. The difficulty of obtaining satisfactory air circulation through a natural draught tower with atmospheric air shade temperatures of 115° F. and the desired cooling water range of 100° F. to 85° F. (wet bulb 70° F.) can be appreciated.

The hard practical facts are that control of air quantities is absolutely necessary for the best results, and this is not possible with natural draught. The heat balance between air and water cannot be kept at the most economic transfer rate without mechanical control of the air quantities.

The contention is, therefore, that "Meteor's" remarks in your issue of October 12, 1950, should be augmented to the effect that 80 per cent. practice and 20 per cent. theory would be useful as a basis of design towards successful application for overseas where high temperatures may be met with.

Mechanolectric

LONDON

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Factory Flameproof Gear

THE recent I.E.E. paper by Mr. D. B. Hogg, entitled "Some notes on electrical installations in large chemical factories," referred briefly to the weight and bulkiness of flameproof lighting fittings.

This has been the signal for a number of comments on the "unnecessary heaviness of industrial flameproof gear" in general, and for a suggestion that "users should set up their own testing station for flameproof gear." It is suggested, on the other hand, in your leading article of November 16 that "manufacturers may not like yet another range of standards to follow."

There is evidently a misunderstanding of this problem which faces user and manufacturer alike. The construction of the apparatus (both for industry and for mines) for which flameproof certificates are granted is determined by:

1. The pressure developed in the flameproof enclosures by the explosion of the inflammable gas or vapour. This is greater for the gases occurring in surface industries than for those in coal mining,

2. The rigidity of the structure to permit accurate machining for the flameproof gaps.

3. Special requirements peculiar to the mining industry and consequent features considered to be necessary for safety when equipment is used in mines.

Items 1 and 2 cannot be altered by setting up another certifying authority.

The requirements of the mining industry on which Item 3 is based are not all applicable to gear for surface industries, and if industrial users want to modify flameproof gear for their use they must draw up suitable constructional standards to the satisfaction of the factory inspector and draft suitable clauses on flameproofness (for possible inclusion in a supplement to B.S. 229).

It would also be necessary to revise the existing British Standard Code of Practice CP1003 for the Installation and Maintenance of Flameproof and Intrinsically Safe Electrical Equipment.

There would then be clear and complete guidance for the existing certifying authority, which can only test and certify strictly in accordance with such guidance, and under these conditions there would be no need whatever to set up another certifying authority.

Is it not possible to tackle the matter from this point of view, which is the only logical one? Results could be achieved in no very long time, and at little cost to industry.

C. G. Whibley
B.E., A.M.I.E.E.

HEBBURN

Electronic Computors

"Ace" Pilot Model now in Operation

RECENT development of pulse techniques in the field of electronics has provided the mathematician with a new high-speed method of representing numbers. This, together with valve switching, has led to the development of electronic computors capable of operating at extremely high speeds. Several of these machines have been developed both in the United States and in this country, and their full potentialities are so far unassessed.

Basic Principles

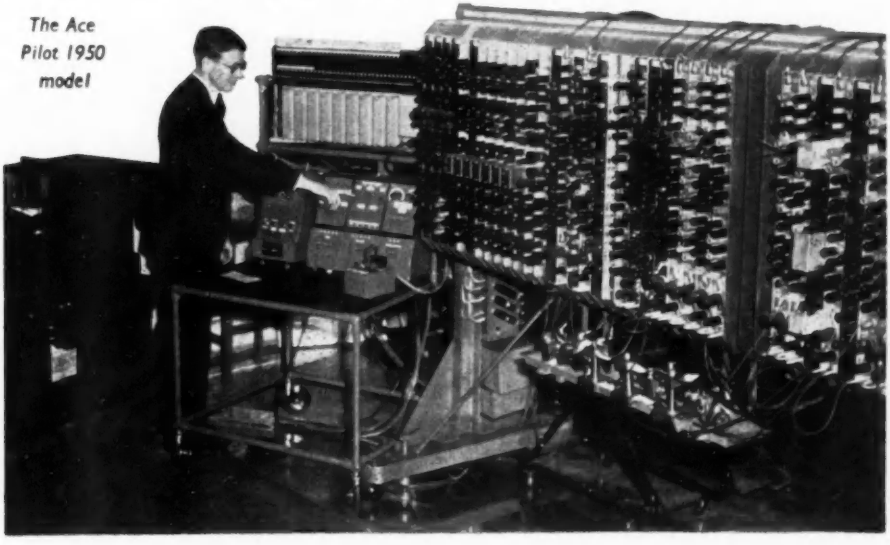
Basically, the system consists of representing numbers by a binary instead of a decimal system. As its name implies, a binary system possesses only two numbers—or two states—in this case 1 and 0. Thus $0 \equiv 0$, $1 \equiv 1$, $2 \equiv 10$, $3 \equiv 11$, $4 \equiv 100$, $5 \equiv 101$, $6 \equiv 110$, $7 \equiv 111$, $8 \equiv 1000$. It can be seen that each binary number is convertible to its decimal equivalent except that a base of 2 is used instead of 10.

Using this system, the problems of addition, multiplication, division and subtraction can be handled easily by electronic circuits. Further, a train of pulses can be kept circulating in a closed circuit by using a "gating" and cleaning valve train, and a delay can be introduced by converting the electrical impulses into supersonic impulses and passing these at the comparatively slow speed of sound through mercury columns in the closed circuit. These closed circuits are what is usually termed the "brains" of the machine, although technically they are only pulse system storage units.

The Automatic Computing Engine

The pilot model of the Automatic Computing Engine (A.C.E.), now operating at the National Physical Laboratory, is limited mainly by the speed of its input and output functions which are in the form of punched cards on the Hollerith system. Fed with the basic data and the programme of operations, the machine is capable of carrying out sequential calculations with extreme speed. Where values such as transcendental numbers, trigonometrical functions, etc., are concerned it is quicker for the machine to compute them *ab initio* than for them to be included in the programme cards as existing functions.

The machine is completely versatile, not being restricted to any specific type or form of calculation, and is particularly useful for the computation of formulae containing several parameters where the effect of variation of any combination is required. Other calculations involving the solution of multiple differential equations are also suitable.



The Ace Pilot 1950 model

MAINTENANCE METHODS — No. 5

Flexibility of Layout

Semi-permanent connections a feature of installation in transformer works

AT the start of this series of maintenance articles, we commented that good installation practice is the only satisfactory foundation for a system which will avoid annoying the Works Manager with machine shut-downs. The importance of installation methods is greater still when a factory works on short runs of "tailored" products, with frequent adjustments to machine lay-out necessary in consequence. In their South Wimbledon factory, Foster Transformers and Switchgear, Ltd., face this problem, and have solved it by close attention to unit drives and a flexible lighting scheme.

A further special feature which makes the factory of unusual interest to the plant engineer arises from the absence of a three-phase supply in this section of the London Electricity Board's Area. A single-phase supply is taken, and is converted to three-phase at medium voltage by the Ferraris-Arno system.

Main Supply

Nominal voltage of the one-phase supply is 2,000, and from an intake substation the current is carried round the factory by a concentric cable which feeds two other transformer substations. The three stations contain, respectively, two 200 kVA units, two 100 kVA units, and one 100 kVA, all of which step down to 220 V. One of the 200 kVA transformers acts as a standby, and the remainder supply a total connected load of 2,500 kVA.

Single-phase supplies are taken at 220 V to the principal distribution boards, which are of standard Foster design. To these are connected the pilot motors required for Ferraris-Arno operation. Each of these machines is a three-phase motor, with suitable arrangements for starting on one-phase supply. When it is running, a voltage is induced in the third phase winding, and this has the correct phase relationship to the other voltages. When further three-phase motors are connected to the two phase-lines and to the third terminal of the pilot motor, they will start, and once they are running will improve the three-phase characteristics.

The main boards feed through switch-fuses or circuit-breakers, according to demand and importance, and some are provided with two-stage maximum-demand relays. These give a warning when the m.d. limit is being approached, switch off the less important sections of the plant, and if the load continues to increase, switch out another section of the switchboard.

Pilot motors are started up by the electrical engineer's staff every morning before work begins, and shut down in the evening at factory closing time. The personnel which undertake this work, and all the electrical maintenance and installation duties, comprise the works electrician and a small staff. Labour for heavy work and cleaning is obtained from amongst the factory employees as required from time to time.

Motors

In all, the factory employs nearly 600 motors, in sizes up to 200 h.p. Most of the machines are three-phase, squirrel cage designs, mounted to give individual drives. There are few accessibility troubles, since the factory has completely changed over from line-shafting, and so motors have been fixed in positions suitable from the maintenance viewpoint.

When a motor comes into the works, it is given a number, and a suitable index card is made out. In addition to the name-plate details, a note is made of where the motor is installed, of the capacitance of the p.f. correction unit associated, and of the source from which the motor was obtained. The card is kept up to date by entering details of tests conducted with the motor, and of the repair and replacement of various components.

Motors are at present thoroughly inspected and overhauled at two-yearly intervals, though it is hoped to reduce this period. Earth testing and the greasing of bearings are carried out more frequently, and a separate log is kept of such work. If a motor has to be moved in connection with the rearrangement of a shop, it undergoes complete inspection and any necessary action is taken.

Few burn-outs due to overload occur, the normal possibility of this arising due to single-phasing of a motor being largely discounted by the conversion system in use. There is, however, a possibility of mechanical damage due to the unintentional tripping of the pilot motor. If this should occur, motors still connected to the two phase wires may hunt, and due to some fortuitous impulse get all the other connected machines away in a reverse direction, through acting as a pilot motor. Relays are now connected to prevent this happening.

A standard form is provided for use in the case of breakdown, and this notes the shop, the machine concerned, details of the defect, and whether the machine is completely out of action, together with the date and time of the report. The same form has room for the maintenance man's report on the incident, and the time at which the machine was restored to order. Thus, a documentary check is given on the time for which a machine is out of action and possibly holding up production.

Some degree of standardisation has been achieved with motor control gear, so that the range of spares to be carried may be kept to a minimum. Allen West, M.E.M., and Electrical Apparatus, Ltd., are the makers of the starters in use, and such apparatus is checked at the time of motor inspection. Standardisation has been carried on to circuit-breakers, designs by George Ellison and Statter being selected, and motors are of Lancashire Dynamo and Crypto, Ltd., manufacture, the Foster Co. being a member of the L.D.C. group.

Portable Appliances

Particular care is taken to ensure the safe condition of all portable electric tools. A rota of inspection has been drawn up, so that each department of the works receives a note once a month instructing them to deliver their portable tools to the electricians' shop just before the end of the day. The tools are signed for, and then Megger-tested, greased and run up. Brushes are renewed if necessary, and the earth lead of the machine is subjected to a current of about 50 amp for three-quarters of a minute. The next day the machines are returned, duly certified as correct, to the departments concerned.

Electric trucks are extensively used for internal transport. Automatic relays are provided at charging stations, and once a week the battery and controller is serviced, a note being made of the temperature and the battery acid s.g., and these details being logged. Brushes on truck motors are examined once a month.

Lighting

Throughout the factory, the general illumination level is kept at about 10 lumens, although photometer checks are taken only when there are complaints from operatives. Fluorescent lighting is a standard feature of the factory, hot-cathode in the shops and cold-cathode in the offices.

A check on lights is made by the night staff, who also see to the cleaning of lamps. For safety, the three tube cold-cathode fittings are fed through a three-pin plug and socket, so that they can be readily isolated.

Incandescent lamps are provided as a pilot system for night use, and they are used in some high-bay fittings in the heavy transformer shop, and also for local machine lighting, being operated at low voltage in this latter instance. Lighting for the factory roads is controlled by a Radiovisor-Parent photo-electric cell system.

The electrical department's stores are situated next to the electricians' shop. Transformers for the portable tool earth-lead tests are provided in the shop itself, together with fuses, contacts and other wearing parts for the standard starters, and brushes for portable tools. Heavier spares, motors, control gear and installation material are in labelled and well-lighted racks and trays in the main stores.

Installation

The importance of installation in the factory has already been stressed. The guiding principle adopted is to make machines as self-contained as possible, and to carry cables so that they will not limit the rearrangement of machinery. Cabling is usually taken to distribution boards in heavy gauge steel conduit, and care is taken to run this along the main roof girders. Trunking, conduit and floor ducting are used for subsequent distribution circuits, and in the first two cases an attempt is again made to keep to main structural elements. Lighting and power circuits are kept separate, and the former is tapped off through plugs and sockets, so that lamp positions are readily changeable.

Both cartridge and semi-enclosed types of fuse are used in the dis. boards and starters, the choice being made according to the duty required. All distribution boards are marked with a distinguishing letter, and with supply details—voltage, and whether single or three-phase. In the main machine shop, distribution boards are provided, and the cabling runs in overhead trunking, dropping down to a switch-fuse on the machine itself. Some other shops have machines fed from floor ducting, the

precise method of control depending on the characteristics of the individual machines. Whereas with guillotines on presses, there is a lot of vibration present, and it is felt that the thermal overload trip of the starter might be damaged, the starter is wall-mounted away from the machine, which is, of course, provided with an emergency stop button.

For most machines the starter is directly affixed, and positioned so that it causes minimum interference with either machine operation or internal transport. To meet this requirement control gear has sometimes been mounted at the back of machinery. Power-factor correction capacitors are connected directly to starters, and they serve to keep the overall power factor up to 0·85 or better.

Flexible conduit is frequently used to protect cables connecting starters and motors, and although the metallic type is usually satisfactory there have been cases where it has been badly damaged due to repeated fouling by materials. A solution to this difficulty has been found in the substitution of a length of tough rubber hose-pipe, secured at each end by a jubilee clip. Such piping has proved most reliable in service, where it is operated with an earth continuity wire running with the cables.

A feature has been made of providing a single-phase supply for lighting and small power use on appropriate machines. The supply is tapped off from two phases at the isolator, and is taken to fuses and a switch contained in a works-made bakelite-faced box. Machine-lighting is fed through step-down transformers at 50 V, centre-tap earthed. The opportunity is taken with these lamp supplies of providing a socket-outlet which can be used for connecting any portable electric tools which may be needed in fitting or maintenance work. Feeding machine lights from the power supply has the advantage of giving some emergency lighting should the general lighting supply disappear.

Benches

Work benches are supplied on a standard pattern, with feeds dropping down from conduit running along the shops, to supply a switch-socket for portable tools, and a lighting transformer. Switches used are of the flush mounting type with recesses for the dollies; they are preferred because of the high risk that any projecting fittings will be accidentally broken.

Our thanks are due to Foster Transformers & Switchgear Ltd., for facilities to collect the information recorded in this article.

Electrical Safety Underground

ISSUED last week, the Report of H.M. Principal Electrical Inspector of Mines for the year 1949 has special interest as the first to appear over the name of Mr. J. Cowan, who succeeded Mr. G. M. Harvey in October, 1949. The report is also notable for recording the lowest number of fatal electrical accidents ever—one. Non-fatal accidents, at 71, were up on recent figures, and Mr. Cowan emphasises that the dividing line between a fatal and non-fatal electric shock is very thin.

Details of the accidents and their causes are summarised in the table, and the report describes the happenings in several of the cases. Discussing the fatal occurrence, the report draws attention to the necessity of *immediate* application of artificial respiration in all cases of electric shock. The words of H.M. Principal Medical Inspector of Mines are quoted: "Remember, absolutely instantaneous death does not occur as a result of electric shock: there is always a chance, however slight."

Cables on battery powered shuttle cars are a potential fire hazard, and some fires have occurred in safety lamp mines as a result of damage to the battery cables on these vehicles. Manufacturers are recommended to fit suitable mechanical guards to protect these cables.

One accident attracts renewed attention to the problem of old types of switchgear still in use. Apart from the matter of inadequate rupturing capacity, the question of busbar contacts which are necessarily exposed when work is being carried out on the switch is of importance. In certain old designs it is impossible to fit a safety shutter, and an electrician who has to work upon such a switch will thus be in close proximity to live metal, unless power is shut off elsewhere.

The report is obtainable from H.M. Stationery Office, price one shilling.

ACCIDENTS AND DANGEROUS OCCURRENCES IN MINES DUE TO THE USE OF ELECTRICITY

Apparatus involved	10-year total	1949
Switchgear and fuses	287	34
Flexible cables, etc.	220	18
Overhead lines	6	1
Unarmoured cables	15	0
Lighting accessories	20	2
Motors and transformers	30	2
Coalcutting machines	6	1
Armoured cable, etc.	79	11
Signalling bells	2	1
Miscellaneous or unknown	5	2

Problems and Practice

IN ENGINEERING

Nearly on Fire

A HOUSEWIFE reported that when using her electric iron the sub-fuses had blown. Also, when trying to light the gas cooker, there was no gas. On investigation the installation was found to be wired with twin t.r.s. cable without earth continuity conductor, and a 2-pin switch plug was situated alongside the gas cooker.

She found, with this arrangement, that the gas cooker made an ideal iron stand.

Unfortunately, the iron developed a dead short to earth. The current flowed through the gas pipe, and arced across to the water main, bursting the gas pipe and igniting the gas. Luckily it was a penny-in-the-slot meter, and the gas burned out before the fire got a proper hold. As it was, the floor beams were very badly charred.

As this had happened during the evening it could have ended in disaster for the occupants. It also proves how deadly the effects of inefficient earthing can be.—*G. D., Lerwick.*

Metallic Plunger Guide

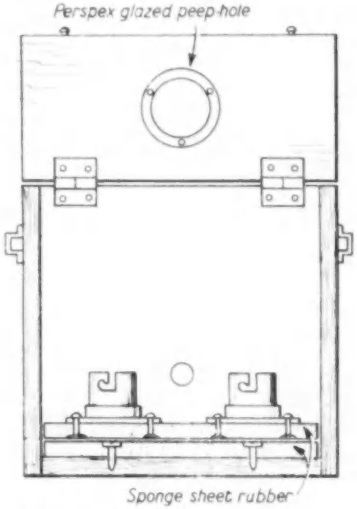
IN your Problems and Practice in Engineering of October 19 your correspondent referred to a no-volt coil of a star delta motor starter. The original guide for the plunger was bakelite, and this bakelite was replaced by a brass tube.

The mechanism evidently functioned correctly but it was surprising to learn that all was well with the coil winding. A metallic guide, if in the form of a rectangular or circular tube, would act as a closed secondary coil to the winding, reduce the impedance of the winding to a very low value, and probably overheat the coil or burn it out.

A metallic guide can be used if a cut is made longitudinally, thereby preventing the formation of a closed circuit at right angles to the magnetic flux.—*K. Coombs*, A.M.I.E.E., A.M.I. MECH.E., *Capetown.*

Test Lamps

IN spite of the convenience of the neon type tester, there are many occasions when a voltage test accompanied by a small load is required. Hence the retention of the time-honoured filament test lamp. To avoid lamp breakages, the carrying box, as sketched, was constructed. The box, built up from multi-ply wood, accommodates two standard 60 W lamps mounted in bakelite batten type holders. These holders are secured to a sheet of sponge rubber which is cemented to a further sheet secured to the bottom of the box. This arrangement adequately cushions the lamps.



Layout of a test-lamp carrying box

The lampholders are wired in series, and the heavy flex, anchored inside, is led out through a side hole, and terminates in a pair of suitable prods. A hinged lid secured by a catch is fitted. An inch diameter peep hole, glazed by a piece of perspex screwed into position, is located in the middle of the lid.

If required, and the user has a sound enough memory, a single-way bakelite tumbler switch can be mounted on the box, and wired to bridge one lampholder when in the "on" position, thus enabling full voltage to be applied to the lamp, or lamps, depending upon whether the test is across phase and neutral, or phase and phase.

Brass loops are fitted on the box as shown to accommodate a leather carrying-cum-neck strap.—*F. S.*

Over-excitation

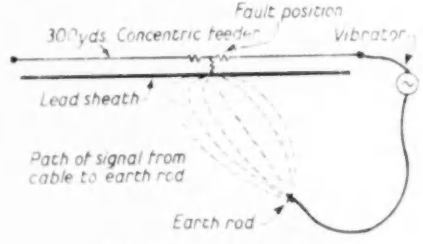
THE following incident occurred to a 2,000 kVA 11 kV frequency changer, supplying a bulk consumer at 50 c/s from the main station 25 c/s system bars. The frequency changer was one of two installed at one end of the engine room, about 250 ft. from the switchboard. The 25 c/s set controls were at one end of the switch gallery and the 50 c/s at the other end.

The switchboard attendant noticed the excitation of the 25 c/s set suddenly increase to maximum and no alteration to the exciter field rheostat had any effect. As the effect of maximum excitation was to increase the stator current also to maximum, the second changer run up and paralleled, and the defective set shut down.

Testing out the excitation leads finally showed that a short circuit had developed in the wires from the shunt field to the rheostat, not very far from the set itself. The wires ran through a conduit buried in the floor and although the installation was believed to be watertight it was not proof against flooding that had occurred some months before the failure. The fault was rectified by re-wiring on a different route.—*H.T.W.*

Cable Fault

DURING the past week I was faced with a fault on an old 3-core 0·40 sq in. concentric d.c. feeder about one mile long. As all cores were well down to earth the Blavier and Overlap tests were applied but with no success, chiefly due to the damaged cable section at the fault. Cuts were made at strategic points and the faulty length was reduced to 300 yd.



Fault location by flow lines

Tests with a search coil picking up an injected signal proved useless due to the signal travelling the length of the cable.

A somewhat unusual method of applying this test was then devised and proved most effective. An earth rod was driven at a point about 100 yd at right angles from the testing end. A signal produced by a vibrator was passed between one of the faulty cores and the earth rod. The path taken by the signal from the cable to the earth rod was then plotted by taking a series of bearings with the search coil over the surrounding terrain.

The results obtained are shown in the sketch, and it will be seen that a good indication of the fault position was established.—*B. L. Stanforth*, A.M.I.E.E.

Measurement of Slip

THERE are a number of methods employed to determine the slip of induction motors when carrying out the usual routine tests generally called for in the motor specification, some of which are: (1) noting the synchronous and actual speeds of the motors; (2) noting the rotor frequency.

The first method can be obtained by using a speedometer. The synchronous speed is obtained from a knowledge of the conditions of the supply, together with particulars of motor regarding number of poles.

The percentage slip is given by:—

$$\frac{\text{synchronous speed} - \text{actual speed}}{\text{synchronous speed}} \times 100$$

$$\text{The frequency } f = \frac{R.p}{60} \text{ c/s per second.}$$

Where R = revolutions per minute

p = number of pairs of poles on motor.

The second method can be applied in numerous ways:—

(*a*) By connecting a moving coil ammeter in series with one of the rotor leads and observing the number of oscillations made by the pointer (complete swings if a central reading meter is employed).

(*b*) By noting the oscillations made by a compass needle when held near the motor frame.

(*c*) By taking the two leads connected to a millivoltmeter and making suitable contact with each end of the motor shaft and observing the oscillation's produced.

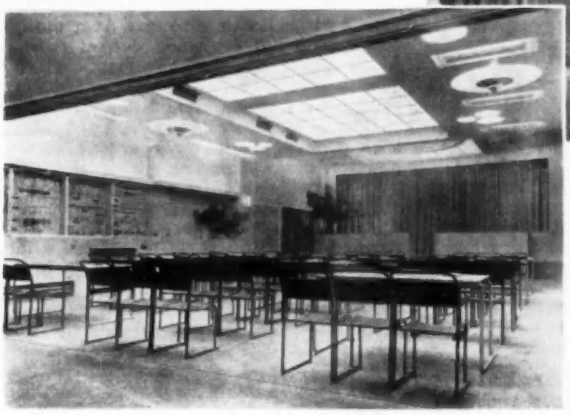
(*d*) By placing a coil of wire (similar to a d.c. field coil) over or near one of the motor bearings and noting the number of oscillations produced in a given time when connected to a milliammeter. The percentage slip is then given by:—

$$\frac{\text{Rotor frequency}}{\text{Stator frequency}} \cdot 100$$

$$\text{or} = \frac{\text{complete oscillations per second}}{\text{frequency of supply in c/s.}} \cdot 100.$$

—*M.I.C.E.*

"FACE-LIFT" for the Lighting Service Bureau



THE L.S.B. Lecture Theatre has been completely remodelled and redecorated, the result being extremely attractive, as is seen from the accompanying illustrations. New features include a large section of luminous ceiling lighting with a figured "Perspex" laylight and a large louverall section, making possible an intensity of over 120 lumens per sq ft.

E.C.A.-South Wales E.B. Joint Conference

AN interesting development in commercial relationships between nationalised industry and private enterprise occurred last week with the holding of a joint conference between the Electrical Contractors Association and the South Wales Electricity Board. The meeting was of an experimental nature to discuss problems both of mutual relationship and of common interest, and two papers were presented. Of these, the first by Mr. A. J. Dalton, dealt with the general question of domestic and commercial (as differentiated from industrial) installations. Many points of considerable interest were raised. Primarily, however, Mr. Dalton pleaded for greater safety and good practice in wiring, allied with an intelligent anticipation of future requirements He emphasised that the introduction of a new tariff in the Western Sub-Area of the Board, which enabled all metering to be carried out on one meter, should do much to clear up the untidy tangles of wires, meters and fuse boxes at the consumer's terminals, as it would permit the use of modern service units.

A particular trouble in the area was the existence of large numbers of spare-time wiremen, who had no technical or financial responsibilities. In some cases it had been found that the materials used had been filched from the wireman's employer's business. Suggestions as to how to deal with this menace were invited. The paper concluded by giving some future estimates with regard to the electrical development of the area.

Following the paper, several points were raised by members of the audience. One E.C.A. member said that although the I.E.E. regulations set forth standards of exemplary conduct, he doubted if they were read as much as they should be. He asked for the Board's policy on the earthing of installations to cable sheaths, and suggested that the running of single-phase power to farms was not likely to prove a load-builder, as farms wanted 3-phase power. Other speakers referred to the vulnerability of flexible cables and placed emphasis on the desirability of broader training for craft apprentices.

After the showing of an E.D.A. film, Mr. R. L. Booth read a paper giving an historical background to the E.C.A. and showing its objectives. This provoked a lively discussion on the training of electricians, during which, Principal Robert James of the Board, expressed the view that too many youngsters wished to become electrical engineers and too few, craftsmen.

At the conclusion of the meeting, Mr. L. Howles, in the chair, sounded the audience as to the success or otherwise of the conference, and it was generally agreed that a most informative and instructive afternoon had been had. Mr. Howles than said that he would put forward the idea of holding future meetings, alternatively in Swansea and Cardiff, to the E.C.A.-S. Wales E.B. Liaison Committee, who had been responsible for the organisation of the conference.

overseas news

Plant for Greece

Contracts for two turbo-alternators and four boilers for the Chalkis power station, Greece, have been placed with A.E.G. of Germany and the American firm of Babcock and Wilcox, it is reported. It is hoped that the station will be in commission before the end of 1952. Meanwhile, increasing demand for power in the neighbourhood of Athens is causing concern, and it is estimated that load-shedding will become necessary by the winter of 1952-53 despite the fact that the Aliveri power plant should be in operation by the summer of 1952. The Government has not yet issued import and exchange licences for the purchase of a 30 MW turbo-alternator for this station, although the contract has already been placed with A.E.G.

Contractors in Australia

In his presidential address to delegates at the annual conference of the Electrical Contractors' Association of Australia, held in Hobart, last month, Mr. S. Bogen referred to safety as being the most important factor in the work of the electrical contractor. While every effort should be made to keep costs of their particular phase of work within reason, the important thing was that it be done while keeping in mind the safety aspect. There was nothing safer than electricity if installed in a competent manner, he declared. Earlier, Mr. Knight, a member of the Hydro-Electric Commission of Tasmania, had pointed out the part the contractors could play in assisting the Commission to sell electricity. He explained that the Commission was faced with rising costs, and if that trend continued, an increase in tariffs was inevitable. But if the contractors would give an efficient service at as low and reasonable a cost as possible when carrying out installations, increased power would be used and more appliances sold.

Brisbane Railways

Negotiations with the City Electric Light Co. and the Brisbane City Council for standardised electrical installations to supply power to Brisbane's electric railways had almost been completed, the State Minister for Transport, Mr. Duggan, revealed in Parliament, last month. He said he hoped to have the specifications required for that work, and the electrification generally, within a month. Tenders are soon to be called for the rolling stock.

Generate or Bulk Supply?

Should Calgary City Council renew its power supply contract with Calgary Power Ltd., or build a new power station of its own? That is the problem to be considered at the next council meeting, for it has been presented with a request from the power company to pay for excess current covering a further 10 year period. The present contract was entered into with Calgary Power Ltd., for 10 years and is due to expire on July 31, 1953. This contract is for power up to a limit of 160,000,000 kWh per year at 0.685 cents per kWh. Last year, however, the city used an additional 13,000,000 kWh and paid one cent per kWh for that quantity, but the company now proposed a rate of 0.75 cents per kWh for the entire consumption retrospective from January 1, 1950, with a further contract for 10 years from 1953 to 1963. Mr. J. H. Wilson, superintendent of the city's electric light department, has recommended that the council cancel the power contract and build a steam power plant in East Calgary to supply the city. Mr. Wilson's proposal provides for a 110,000 kW steam station using natural gas as fuel, costing $12,122,800. The plant would be located on the south side of the Bow River. Reporting upon this proposal, Haddin, Davis & Brown Ltd., consulting engineers, state that a steam power station could supply the city for an average cost over 10 years of 0.6675d. per kWh. Total average annual charge of plant would be $1,775,263, compared with the power company's charges of $2,014,733, showing a saving of $237,510 for the average year. The plant would be written off in 20 years.

Nova Scotia Project

A new power development with an estimated output of 7,000 kW is to be constructed on Bear River by the Nova Scotia Power Commission. Tenders for its construction are now being received by the Commission, Mr. E. J. Cragg, commission-manager, announced last month. The Bear River plant, called the Gulch Development, marks another step forward in providing adequate power for all districts in Nova Scotia.

Close Sales Shops?

A resolution urging that electrical shops operated by various public utilities commissions should be closed down, has been passed on to the Ontario Chamber of Commerce. The resolution was sponsored by the Belleville delegation, who explained that the shops had been opened originally to boost the sales of electrical appliances in the days when it was thought that the best way to reduce power costs was to increase the load. It is complained that the shops had few of the private enterprise overheads, such as corporate taxes, rents, heavy sales help, wages and credit systems. The general manager of the Toronto Board of Trade, has pointed out that in Toronto the P.U.C. shops boost the smaller retailers in their advertising, pay overhead costs and allow smaller retailers to make big sales through their shops.

Niagara Development

The Hydro-Electric Power Commission of Ontario has asked the Provincial Government to make available $157 millions for the first stage of the expansion of Niagara River generating plants. The government is expected to indicate its approval to the Commission within the next few days. Some $600,000 has already been spent on groundwork for the new project. Camps for workers are being established at Niagara Falls. The first stage will give the Commission another 600,000 h.p., and the second will provide between 300,000 and 400,000 h.p.

A Reserve Against Increased Charges

Although with only 8 per cent. of Canada's population, British Columbia had 30 per cent. of the country's established water power, General W. W. Foster of the B.C. Power Commission told delegates at the second annual conference of the Electrical Inspectors' Association of B. C. in Vancouver recently. Dealing more specifically with the Commission, he stated that that body started in 1945, taking over 23 companies who were supplying 13,000 consumers. Today the latter had increased to 40,000. The province had been divided into 24 power districts, each of which must be self-supporting. Cost of production was varied throughout the province, to determine the charges to be made in all districts. In some instances the commission had cut rates by 50 per cent., but the sum of $750,000 has been set aside to assure consumers of no increase in tariffs due to such causes as a business depression.

Protection

For the purpose of protecting its power plants the Hydro-Electric Power Commission of Ontario has recently strengthened its Security Department. The chairman, Mr. R. H. Saunders, has said that the Commission's power plants were so important in the economy of the country that it would be a severe blow if one of the plants were put out of use, either by design or accident.

Holland Wants Copper

Dutch wire and cable factories are so short of copper they will have to close down unless Holland is allowed to buy on the free market, it is learned. The Dutch factories have now approached the Government on the matter and it is hoped that Holland will be allowed greater purchase freedom. Holland has no free dollars for copper purchases, and Britain and Belgium have ceased exporting copper to her, it is stated.

Indian Draft Standard

The Electrical Plant and Switchgear Sectional Committee of the Indian Standards Institution has issued a draft Indian standard specification for the electrical performance of three-phase induction motors for industrial use with class "A" insulation.

Bloemfontein Progress

The City of Bloemfontein electricity undertaking sold over 54 million units during the year to March 31 last—an increase of about eight million units. A further 844 consumers were also added. Mr. G. J. Muller, city electrical engineer, in his report, refers to the generation position as being critical during the past winter, the maximum load recorded being 17,200 kW compared with 13,400 kW in the previous year. But although a further 7,500 turbo-alternator and a 75 klb/hr boiler has since been installed, making a total installed capacity of 24,000 kW, there will be no reserve at the station next winter. Another 7,500 kW set and 75 klb/hr boiler is on order for commissioning in 1953, and the city's consultants, Merz and McLellan are designing a new station with an ultimate capacity of 70,000 kW, to be erected adjacent to the existing one. For this, tenders are to be called for one 10,000 kW set and two 110 klb/hr boilers, coal handling plant, cooling towers, etc. The original plan to have two turbo-alternators and three boilers in the first stage had to be pruned down to conserve capital funds. For the same reason, the department has had to curtail its activities in regard to new extensions.

Rural Development

A power distribution scheme for rural areas at an estimated cost of £210,000, was laid before the Pretoria City Council's Trading Committee last month by the city electrical engineer. Work on this second programme—the first will be completed in about 12 to 18 months—will probably start in 1952. Borrowing powers for the expenditure have been authorised by the Union Treasury. The Council, under licence from the Electricity Control Board, supplies electricity in a territory of 1,500 square miles.

Industrial Demand

Because of the rapid increase in the demand for industrial power, particularly the large requirements of the Rhodesian Alloys Ltd. ferrochrome plant when it comes into operation, officials of the Electricity Supply Commission of Southern Rhodesia recently met officials of the Gwelo Town Council to discuss the question of sites for a new substation and workshops. It was decided to give the Commission a 30-acre site in the industrial area immediately south-west on which to erect a new substation, etc., provided that a cable is laid without cost to the council to the existing substation which the council will buy.

Progress at Waipori

The No. 4 tunnel, 3,650 ft. long and 8 ft. wide, for one of the two new hydro-electric power stations at Waipori, is expected to be completed to the stage where concreting inside can begin by Christmas. The station is being built for Dunedin City Council. The tunnel to serve the No. 3 station is also more than two-thirds completed, it is reported.

PERSONALITIES

IN THE INDUSTRY

Manager of the Illuminating Glassware Department of Falk, Stadelmann and Co. Ltd. from 1896, **Mr. C. H. Bailey** is relinquishing the management of that department at the end of March next, we learn. He will, however, be regularly attending the office for active consultation. Mr. Bailey joined Falks in 1890, and has now completed sixty years' service with the firm, on which achievement his many friends in the industry will wish to join us in offering him hearty congratulations.

Mr. C. H. Bailey

Yesterday, **Lord Citrine,** P.C., K.B.E., COMP.I.E.E., chairman of the B.E.A., sailed in the S.S. *Himalaya* for India to attend next month's sectional meeting of the World Power Conference in New Delhi. He was accompanied by **Mr. G. R. Peterson,** B.A., A.M.I.E.E., overseas liaison engineer, **Mr. J. Warnock,** A.M.INST.C.E., M.INST.STRUCT.E., 'hydro-electric engineer (Merseyside and N. Wales Div.), **Mr. R. Y. Sanders,** F.S.S., deputy commercial manager (development) and **Mr. C. A. Cameron Brown,** B.SC., M.I.E.E., M.I.B.A.G.E., agricultural adviser to the B.E.A.

To mark the completion of fifty years' association with the Electric Construction Co. Ltd., **Mr. Harold Patten,** sales manager, was recently presented with an illuminated and inscribed wallet by **Mr. W. M. Furniss,** chairman and managing director, subscribed by the directors, members of the executive staff, and district engineers. Our accompanying illustration shows Mr. Furniss, left, making the presentation.

Presentation to Mr. H. Patten, right, by Mr. W. M. Furniss

Mr. J. B. Moffat left for South Africa in the *Clan Shaw* last Thursday to represent Erskine, Heap and Co. Ltd., on the technical sales staff of their agents for South Africa and Rhodesia, Hubert Davies and Co. Ltd. Mr. Moffat received his technical education at the Glasgow Royal Technical College, followed by a full apprenticeship with Harland and Wolff Ltd. After spending a period with the Brush Co. at Loughborough, he joined his present firm early in 1949.

At the end of this month, **Mr. J. O. Twinberrow,** B.SC., A.M.INST.C.E., will be retiring from the position of manager of the Publicity Department of

Mr. J. O. Twinberrow

Mr. G. M. C. Peacock

Babcock and Wilcox Ltd., in order to take up an appointment as secretary of the Boiler Availability Committee. He is to be succeeded in the former position by **Mr. G. M. C. Peacock,** A.M.I.E.E. Mr. Twinberrow is, of course, a prominent figure in connection with boiler house practice. He gained early training in engineering shops in the north country and more practical experience with the Canadian Pacific Railway. He joined Babcock and Wilcox office in Canada in 1920, eventually becoming chief assistant engineer in charge of boiler design, on the formation of the Canadian company in 1924. He returned to London in 1928, a strong protagonist in the Bailey furnace. Temporarily taking over the post of manager of the Publicity Dept. at the end of 1930, he fulfilled the duties with such success that he remained there. His successor, Mr. Peacock, was born in New Zealand, and after training with the Auckland Electric Power Board, joined the Metropolitan-Vickers Electrical Co., in 1929. He became publicity engineer to the Hackbridge Electric Construction Co. in 1933, made manager of the Progress Department four years later, and promoted to manager of the Publicity Department of Hackbridge and Hewittic Electric Co., this year.

Last week **Mr. D. G. Sutherland,** B.SC., M.I.E.E., left this country for South Africa to take up his position as general manager of Scottish Cables (South Africa) Ltd. For the past 5½ years he has been sales manager of Scottish Cables Ltd., Renfrew, and, prior to leaving, he and Mrs. Sutherland were entertained to dinner by the directors. At this function the governing chairman, **Mr. Wm. Fraser,** presented Mr. and Mrs. Sutherland with gifts as mementos of the occasion.

Mr. Fraser, left, handing the memento to Mr. Sutherland

Prof. E. D. Adrian, O.M., was elected president of the Royal Society at its meeting last week.

This month, **Mr. W. A. Rolls** has assumed duties as power station superintendent at Grove Road generating station, London Division, B.E.A., in succession to **Mr. A. B. Harvey,** whose impending retirement we referred to on November 23. Mr. Rolls was formerly deputy power station superintendent at that station.

Well known both in this country and in America for his research work in connection with magnetic materials, is **Dr. F. Brailsford,** PH.D., M.I.E.E., who, as we briefly reported last week, has been appointed to the second chair of Electrical Engineering tenable at University College, London, from January 1 next. His special responsibility will be heavy current work. He has had very wide experience in industrial research, having been a member of the staff of the Research Department of the Metropolitan Vickers Electrical Co. since 1929. In the academic sphere he has had experience as a part-time teacher both at Manchester University and at the Manchester College of Technology.

Dr. F. Brailsford

Following the appointment of **Mr. A. C. Thirtle,** A.M.INST.C.E. A.M.I.E.E. M.INST.F. as divisional controller of the South Western Division of the B.E.A., **Mr. L. W. Stretton,** M.I.E.E. has now been promoted to chief generation engineer (operation) with the Eastern Division. He was formerly generation engineer (op.) Southern Group in that division.

Mr. John Taffs, who retired from the position of publicity manager for The English Electric Co. at the end of June last, was presented with an "English Electric" television receiver at a brief ceremony at Queens House, Kingsway, a few days ago. The presentation was made by **Mr. E. B. Banks,** commercial manager of the company, in the presence of a large number of senior officials.

A great-grandson of the late Mr. W. H. Allen, founder and first chairman, **Mr. Denis W. M. Allen** has been appointed a director of W. H. Allen, Sons and Co. Ltd. Of recent years he has worked on the executive duties on the engineering side of the organisation, being responsible for the work of the Installation and Service Departments.

Our congratulations to **Mr. C. H. Crowlie,** sales manager of Hoover Ltd., on completing thirty years' service with that company. He joined the firm as a salesman in 1920, and has held his present position since 1947. Early this year, he was also appointed a director of Hoover (Electric Motors) Ltd. Mr. Crowlie is prominently associated with the Incorporated Sales Managers' Association, being a member of two national Standing Committees and a vice-chairman of the Royal Counties Branch.

Mr. C. H. Crowlie

Newly elected president of the Electrical Trades' Commercial Travellers Association for the 1950-51 session is **Mr. H. A. Deacon,** managing director of Cryselco Ltd. Chairman of the Association is **Mr. L. A. Fickling,** who had been associated with the electrical trade for many years and is sales manager of Linolite Ltd.

At the end of this month **Mr. F. W. Pridmore,** A.M.I.P.E., A.M.I.W.M., is giving up his position as works manager of the Igranic Electric Co. Ltd., at Bedford, as he is to go to South Africa to become managing director of a company now being formed with the title of Brookhirst Igranic S.A. (Pty.) Ltd., with offices in Johannesburg. He has been with Igranic for many years, gaining experience at the Glasgow and Leeds offices before becoming personal assistant to the works manager in 1943. He has been works manager since 1945.

OBITUARY

The death on Saturday last, at the age of 70, of **Mr. Percy Good,** C.B.E., F.C.G.I., M.I.E.E., director of the British Standards Institution, will be deeply regretted by all in the electrical industry who had been privileged to know him. He had for long been a stalwart exponent of the benefits of a degree of standardisation and made that subject the theme of his Presidential Address to the I.E.E. in 1947. He had, in fact, devoted about 28 years to standardisation work, having earlier spent some while in the Faraday House testing department as superintendent.

Mr. Percy Good

He joined the British Engineering Standards Association (later B.S.I.) in 1913 as assistant secretary, he became deputy director in 1929 and director in 1939. He was chairman of the Joint Lighting Committee of the Ministry of Home Security and the I.E.S. during the last war. He was also a past-president of the Illuminating Engineering Society.

The death ocurred on November 26 of **Mr. P. A. Mole,** aged 66, managing director of M. Mole & Son Ltd.

We note the death, on November 27, of **Mr. E. H. Dixon,** B.Sc., M.I.E.E., who was Head of the Electrical Engineering Department at the Royal Technical College, Salford, from September 1914, to September 1937.

Mr. E. D. C. Owens, A.M.I.E.E., manager of the Swansea District office of the British Thomson-Houston Co. Ltd. from 1933 to 1947, died on November 30, aged 64.

The 1950 Smithfield Show at Earls Court

THE Smithfield Show has for years been one of the highlights in the stockbreeders' calendar, and now that this hardy annual has expanded under the lofty roof of Earls Court Exhibition Hall, its new London home, into The Smithfield Show *and* Agricultural Machinery Exhibition, it becomes also, a highlight in the arable farmers' year.

Men and women of agriculture from all Britain and most probably the whole world, have this week thronged the show to see the prize-winning livestock for which Britain is famed. What better occasion is there for meeting the farmer today well alive to the merits of farm mechanisation!

Items of equipment especially notable and in the majority of cases shown for the first time are many, natural if one appreciates the ever increasing size of this show. They include an ingenious electric pig feeder, which was shown by ARNOLD AND SONS. A grass seed cleaning plant, electrically driven, shown by R. BOBY & SON, the CHURN COMPANY's latest combined electric separator and butter churn, new electrically operated animal-grooming gear and gear for scraping black from pig carcasses before they are cured, made by the FLEXTOL ENGINEERING CO.

Shown by R. J. FULWOOD & BLAND LTD. for the first time, is a portable herd yield recorder; their midget electric milking plant is also interesting.

FYNA INDUSTRIES show a new mill which separates fibre from ground material and delivers this material into separate compartments. Also, for the first time at Earls Court, GASCOIGNES OF READING show the "Rotor-freeze" unit for bulk milk cooling.

The large grain suction plant just produced by GEO. W. KING LTD., occupies the greater part of the stand of this well-known firm, who number electric hoists amongst their numerous products.

Interesting to the dairyman are, no doubt, precision-built electrically-operated cream separators shown by R. A. Lister, while, to the man with barn problems on his mind, the new "PW16" Winnograde Junior by PENNEY & PORTER (1932) LTD., is important.

Brand new equipment featured at the Show also includes the "Scotmec" fanless "Super Giant" Hammer Mill by SCOTTISH MECHANICAL LIGHT INDUSTRIES LTD., the "Typhoon" and "Tempest" Mills by TEMPLEWOOD ENGINEERING CO. LTD. and the full capacity butchers' cold room and the refrigerated enclosed butchers' display slab by UNIVERSAL REFRIGERATORS LTD.

Two other new machines shown for the first time at the Smithfield Show will, without doubt, intrigue the professional hedger and ditcher, they are the improved Hedgemaster and the Grassmaster. This Hedgemaster by the TARPEN ENGINEERING CO. LTD., is larger and more powerful than the Tarpen Trimmer and is especially suitable for use on farm and roadside hedges.

To show how "Electricity does it," E.D.A. have this year featured many working models of farm electrical equipment; special attention is focused on hay-drying, grain drying and milling equipment, but their display is backed up with equipment showing other applications of power. B.T.H. have a stand on the first floor, where they display electric control gear, motors, magnetos, heating equipment and Mazda fluorescent lighting.

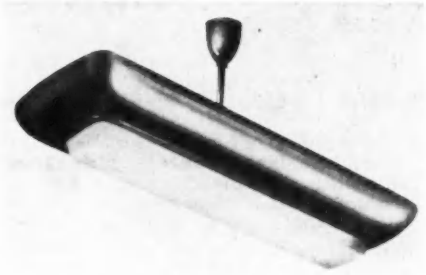
Marconi Instruments this year feature moisture meters for grain, seeds, and tobacco and for timber.

Frigidaire quite appropriately concentrate on equipment for the meat trade on their stand at 'Frig. Corner." Here too, International Refrigerators have their display of equipment.

The BUYER'S *Column*

Four-Footers to Fit the Home

WITH the limited accommodation of the modern home in mind, "Atlas" lighting designers have concentrated on producing a suitable fitting incorporating fluorescent lamps yet of a size in proportion with its intended surroundings. Result of the designers' efforts is an attractive new fitting, the G.K.4240, in which four 2 ft. 20 W lamps have been positioned. THORN ELECTRICAL INDUSTRIES, LTD., 105 Judd Street, London, W.C.1, are justly proud of their new fitting, which, combining direct and indirect lighting, represents a fitting of compact modern design, handsome by day and pleasing, efficient and economical by night.



The attractive Atlas G.K.4240 fitting

The external surfaces of the reflector are finished in glossy bronze and the inner surfaces in stove-enamelled white. The diffuser tray is of 030 opal "Perspex."

Warm white lamps in the outer positions for indirect lighting and peach for the centre direct lighting are recommended by the makers. A novel system of suspension has been adopted. A small slotted saddle carrying a terminal block for mains connections is screwed to the ceiling, the fitting is hooked to this, and the cover is slid into place. Price of the G.K.4240 is £12 0s. 8d., including purchase tax, but not lamps.

Silica Dusted Lamps in Smaller Sizes

FORTY and 60 W sizes of the recently introduced silica-coated filament lamps are announced by four E.L.M.A. member companies.

Crompton Parkinson's "Whitelight" lamps available for all voltages between 200/260 in both sizes. Metropolitan-Vickers' Metropal lamps, Philips' "Argenta" lamps and G.E.C.'s Silverlight in these new sizes will cost 1s. 7d. plus 5d. purchase tax.

As from December 1, stocks are available for immediate delivery. The 100 W size introduced last April is still 2s. 7d. including purchase tax.

Prices Rise

FOUR more firms have found that due to increased costs all round they have been compelled to raise their prices.

TAYLOR ELECTRICAL INSTRUMENTS, LTD., 419-424 Montrose Avenue, Slough, Bucks., have increased the price of their Model 304 Oscillograph to £33 10s.

An increase in price is also announced by BYLOCK ELECTRIC LTD., South Street, Ponders End, Middlesex. The price of their Vortex Mk II spray unit is now £9 7s. 6d. per machine.

BACKER ELECTRIC CO. LTD., Fitzwilliam Road, Rotherham, announce an increase of 10% on their whole range as from 11th December.

EKCO-ENSIGN ELECTRIC LTD., Southend-on-Sea, Essex, announce a small increase in the price of their Plastalux light fittings. As from Monday, December 4, the new prices are: Model FF11, 5s. plus 1s. 3d. p.t.; Model FF12, 6s. plus 1s. 6d. p.t.; Model FF22, 4s. 3d. plus 1s. 1d. p.t.

Warmth Within

A NEW release by H.M.V. HOUSEHOLD APPLIANCES LTD., Hayes, Middlesex, is the model H.P. warming plate which is priced £6 6s. (no purchase tax).

It is an attractively styled unit and will prove a boon to the housewife as well as to the hostess. Outstanding features claimed for this new appliance are that it is the first British-made warming plate with thermostatic control and that the correct operating temperature is reached twice as quickly as any other model.

Its appearance is a considerable factor in its favour: the ivory vitreous enamel finish to the plate, stain-resisting and easily kept clean, the black plastic insulated handles and feet combined have an air of functional elegance.

A simple on/off switch is fitted and a 9-ft. lead of 3-core flexible cable is supplied. For use on a.c. supplies 110/130 and 200/250 V, the warming plate is rated at 700 W. Overall dimensions are $22\frac{7}{8}$ in. × $10\frac{3}{4}$ in. × $2\frac{5}{8}$ in.

H.M.V.'s stylish warming plate is also very practical

D

"Tru-Glow" Fire Spares

PERMISSION has been granted by Truvox Engineering Co. Ltd. of Wembley, to Metway Electrical Industries Ltd., King Street, Brighton 1, to supply type BE 372 bars as replacements in the "Tru-Glow" DF11 AB fire. Truvox are unable to supply these replacements and are passing all enquiries to Metway's, who are able to offer prompt delivery.

Lighting On Tap

DEVELOPED to provide an installation whereby inspection handlamps or movable pendant lights may be used in any part of a building without the difficulties encountered in the use of normal voltage handlamps, the Kelvin Norton overhead grid system for l.v. lamps should prove invaluable in any modern garage.

The system itself comprises four main parts: (a) the transformer supplying 12 V, (b) the overhead grid consisting of twin copper overhead lines, (c) the hook-up lamp assembly, a rigid insulated rod with clip hooks at the upper end, and (d) the clip-on lamp holder.

This patented system is supplied by THE KELVIN-NORTON ELECTRIC CO., LTD., Safetex Works, Barbould Street, Warrington. Its main advantages are: lighting wherever it is wanted, ease of connection, and a high margin of safety through the use of a low voltage supply.

News for Disc Jockeys

TWO new record players have been put on the market by Richard Allan Radio Ltd. They are designed to cope with the present somewhat unstable situation where records are being made for three different playing speeds.

The three-speed single player with h.f. pickup is £18 4s. (inc. tax), and the three-speed auto-non mixer with h.f. pickup costs £24 19s. 10d. tax paid. Prices include two pickup heads.

Price increases on existing models make the following new prices: Type RDM, £12 13s. 4d.; RDHF and RDC, £13 4s. 2d.; CDM, £15 10s. 6d.; CDC, £16 2s. 6d.; CDUM, £20 14s. 2d.; NHF Auto, and NC Auto, £20 19s. 10d. All prices are tax paid.

TRADE PUBLICATIONS

COOKER SPARES.—We have received from the Simplex Electric Co. Ltd., Oldbury, Birmingham, a copy of the export edition of their interim Cooker Spare Parts Price List.

SAFETY TOOLS.—The Telegraph Construction and Maintenance Co. Ltd., 22 Old Broad Street, London E.C.2, have now issued a revised edition of their booklet relating to Telcon Bronze (Berylium copper) safety tools.

SOUND EQUIPMENT.—Another firm which does a great deal of trade in this field is the General Electric Co. Ltd., Magnet House, Kingsway, W.C.2. They have issued an interesting booklet surveying the uses and installations of their equipment.

DRY BATTERIES. Catalogue R.P. has been issued by Holsun Batteries Ltd., 137 Victoria Street, S.W.1. It lists the range of "Pertrix" batteries available for radio, torches, etc.

RADIO AND ELECTRICAL COMPONENTS. "The Choice of Critics," radio, radar, T.V., telecommunication, electronic and electrical components made by A. F. Bulgin and Co., Ltd., Bye Pass Road, Barking, Essex, are listed in the 1950/1951 catalogue just issued.

SOUND AMPLIFIERS. A leaflet entitled "Sound" has been issued by Communication Systems Ltd., Strowger Works, Liverpool 7. It summarises the A.T.M. amplifier and distribution system.

LABORATORY MACHINERY. Publication No. 9602, superseding No. 9601, has been received from the Sturtevant Engineering Co., Ltd., Southern House, Cannon Street, London E.C.4.

RADIO LOUDSPEAKERS. Leaflets showing Truvox reflex horn speakers, the Senior speaker driving unit and horn and the 12 in. BX11 c.p.m. speaker have been published by the Truvox Engineering Co., Ltd., Exhibition Grounds, Wembley, Middx.

SOIL WARMING GEAR. Electric soil warming equipment for the amateur and the professional gardener is the subject of a leaflet, AG1210, which the General Electric Co., Ltd., Magnet House, Kingsway, will send to any reader on request.

VEHICLE BATTERY CHARGERS. "Hewittic" chargers for electric vehicle batteries are listed in leaflet R235 issued by the Hackbridge and Hewittic Co., Ltd., Hersham, Walton-on-Thames.

EVAPORATION AND DISTILLING PLANT. Publication No. 151, issued by G. and J. Weir Ltd., Cathcart, Glasgow S.4, introduces the range of plant produced by the company.

NICKEL ALLOYS. No. 327 of the series "Wiggin Nickel Alloys," published by Henry Wiggin and Co. Ltd., of Birmingham, is devoted to the use of high nickel alloys in aircraft construction.

INSTRUMENT OILS. "Microtime" oils and greases for delicate mechanisms and "Microloid" colloidal graphite lubricant are featured in leaflets issued by the makers, British Industrial Products, of Selwyn House, Holborn, W.C.1.

INTERCOMMUNICATION SYSTEMS. "Let's get straight to the point," is the title of a leaflet issued by Communications Systems Ltd., Strowger Works, Liverpool 7. We think it appropriate.

HARD FACING FOR METALS. The application of hard alloys to steel components by special welding techniques to save wear is described in a folder published by Flexibox Ltd., Nash Road, Trafford Park, Manchester 17.

Centre for Service

Bristol's Electricity House showrooms opened

ORIGINALLY planned 20 years ago by the Corporation Electricity Committee, the new Electricity Service Centre on the ground floor of Electricity House, Colston Avenue, the headquarters building of the South Western Electricity Board, was officially opened on Wednesday of last week by the Lord Mayor of Bristol, Alderman F. A. Parish.

It says much for the skilful designing of Sir Giles Gilbert Scott that the new service centre is in the forefront of modern practice in regard to service centres. It may be recall.d that when work on the building was halted in 1940, the outer shell had been completed, and this was utilised during the war as an aero-engine factory. In completing the Centre, the Board has adhered as closely as possible to the plans approved by the Corporation, although it has been necessary to adapt the finish and treatment to conform with present-day economy standards.

Situated in the heart of the city, fronting on to the busy shopping area, the new Service centre consists of a large and well proportioned main hall, a smaller inner hall (for demonstrations, or other meetings), with a lighting advisory bureau in the basement. The main entrance is flanked by two large curved display windows with four smaller windows one each side, while the main half will accommodate an enquiry bureau, an applica tions section, and accounts section in addition to many display features.

Smith and Ansell Ltd. designed the lighting installation which is simple and functional in style and follows the lines of the architectural plan, utilising 8 ft fluorescent lamps with intermediate spotlights which may be concentrated on a particular display. Of particular interest is the lighting advisory bureau, the lay-out and fittings in which, are the work of Mr. T. Topping, of the Board's Estates Department. Here, different types of lighting arrangements have been grouped into separate cubicles, and the switching arranged so that a prospective customer may see individual fittings chosen in use. Other sections will enable tradespeople to judge from actual examples which lamp is best suited to display their particular goods.

At the opening ceremony, Mr. S. F. Steward, C.B.E., paid tribute to the foresight of the Corporation Electricity Committee in planning such a fine building, and afterwards presented the Lord Mayor and members of the former Bristol Corporation Electricity Committee with ashtrays made from Ancaster stone used in the construction of the building. To the Mayoress he also presented an iced cake (made for the event and given by Ester Purvis). To commemorate the occasion, a modern electric cooker was also presented to a typical Bristol housewife.

Top: General view of the service centre: next is a corner of the display living room; and bottom, the "Christmas Bazaar" feature, a special attraction

THE WEEK

INDUSTRY *in news* COMMERCE

T.I. Acquire Canadian Interest

A STATEMENT by the chairman of Tube Investments Ltd., Mr. I. A. R. Stedeford, last week, revealed that negotiations have now been completed for the acquisition of a substantial interest in the Canadian firm of Standard Tube Co. Ltd. It is understood that including the provision of new plant a sum of nearly £1 million is involved in the transaction. The Woodstock, Ontario, company will be renamed The Standard Tube and T.I. Ltd.

It has been mainly concerned with the manufacture of electrically welded precision steel tubes for the Canadian market, but in partnership with Tube Investments its activities will later be extended to cover a wide range of precision, mechanical and pressure tubes. The British firm's new associates will be responsible for supervising and developing T.I.'s export trade in Canada, and is one more addition to the list of Tube Investment's subsidiary or associate companies scattered throughout the world.

Eastern Board's Economy Campaign

THE Eastern Electricity Board are this month intensifying their campaign for economy in the use of electricity. Advertisement space has been booked in newspapers circulating in the area and leaflets are being distributed to each of the three main classes of consumers—domestic, small commercial and industrial. Basis of the appeal is that if peak hours are avoided there would be no need for electricity cuts. Explanatory paragraphs on the causes of cuts and methods of counteracting them will do much to help users understand the position more clearly. Electric fires are outlawed in all three leaflets, and in the appeal to small commercial consumers fluorescent lamps are particularly advocated as they use less electricity. The Board offers many suggestions on how to do away with power cuts, including one which asks employers to ensure that if their staffs brew afternoon tea it should be done before the 4 p.m. peak.

The Dunkirk Spirit

THE electricity supply industry was overdue for far-reaching reorganisation on a national basis, said B.E.A. secretary, Mr. H. F. Carpenter, at the first annual meeting of the North West Midland section of the Electrical Power Engineers' Association at Wolverhampton recently. The B.E.A. was putting the Dunkirk spirit into the provision of new power stations, he said, and in ten years it was expected that the number of units generated would be double what it was at present. Looking still further ahead, Mr. Carpenter said that by 1970 it was hoped to generate about three times as much electricity as the estimated demand at that time.

Machinery Traders' Dinner

ONE of the most pleasant of the year's functions is the annual dinner-dance of the Association of Electrical Machinery Trades, and this year's event, at the Savoy last week, was typical of such occasions, with speeches reduced to the minimum, but nevertheless containing a more real substance than often more lengthy proceedings provide.

After the loyal toast, the chairman, Mr. R. H. Gill, proposed the only other toast, that of "our guests." He paid a special tribute to the president, Mr. Lawton, and hoped he would be fully restored to health. Continuing, he suggested that members of the Association could be better used by B.E.A.M.A. They carried stocks of materials which may be in short supply. Recognition of firms as distributing agents by manufacturers similar to that done in other trades, would be a useful step, for members of the Association have exceptional facilities for service and a valuable knowledge of local requirements.

Replying to the toast, the Hon. James R. Rea, secretary of B.E.A.M.A., spoke of the value of trade associations under present industrial conditions. He personally hoped that there would be greater co-operation in the future between the

The First Half-Century

The debate on Mr. Langdon's paper "On the Supersession of the Steam by an Electric Locomotive" will probably be concluded tonight. Its importance is not to be valued by the intrinsic worth of its contents, but by Mr. Langdon's position of head of a department in one of our greatest railway companies. His figures were not always consistent and he had a nomenclature of his own which made it easier to put his results on one side and calculate afresh. Another criticism was nipped in the bud by Mr. Langdon's explanation that his figures were not applicable at a speed under 15 m.p.h. Meanwhile Professor Ayrton had been monkeying with the electric light lead, and turning Mr. Langdon's table lamp on and off—to the evident distress of the latter, since he naturally wanted to take notes of his critic's objection. (*From our issue of December* 6, 1900.)

Mr. George Tomlinson, Minister of Education, experiments (right) with part of the B.T.H. equipment presented to the Rugby College of Technology and Arts last week. Below, the Minister has a detail of some machinery explained to him by Mr. A. Draper, head of College's electrical department, on whose left is Mr. L. J. Davies, director of research and education at B.T.H.

Association and B.E.A.M.A. In his view the formation of a permanent joint committee would be beneficial to both associations.

Following the speeches, dancing continued until midnight, interspersed with a most excellent cabaret.

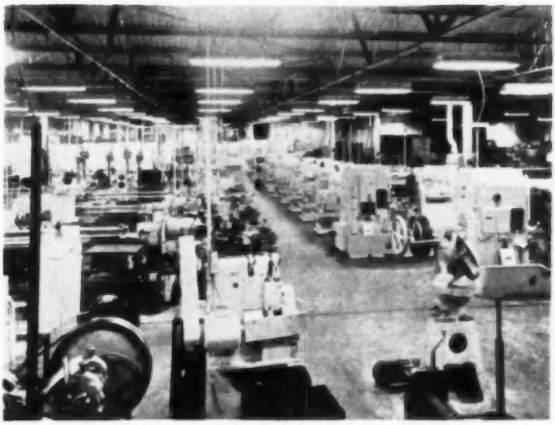
A Great Partnership

THE partnership between industry and education in Rugby which has made the town the envy of all concerned in the two spheres since the first world war, has been tested recently and not been found wanting. When it was found that the Rugby College of Technology and Arts required equipment to help students carry out tests under working conditions, the British Thomson-Houston Co. Ltd. came to the rescue and supplied electrical engineering equipment estimated to be worth over £20,000 in replacement value. The machinery was formally handed over by Mr. L. J. Davies, director of research and education with B.T.H. at a ceremony last week, attended by the Minister of Education, Mr. George Tomlinson. This ceremony formed the latest chapter of a partnership which started in 1931 when B.T.H. gave £100 as a gift to the College for further education in Rugby. Amongst the machinery presented were twenty demonstration units for the Department of Electrical Engineering and two transformers with equipment for the high-voltage laboratory.

Staggered Hours—a Solution

NORTHERN industrialists believe that only a return to the system of staggered hours would effectively achieve the increased load-spread among industrial and commercial consumers being advocated by the Electricity Committee of the East and West Ridings Regional Board for Industry. After a meeting of the Committee last weekend, the chairman, Mr. G. H. Bagnall, said the 10% load-spread was wholly inadequate and the Committee were to ask that the minimum load-spread throughout the country should be increased to 20%.

Quoting examples on how economy could be practised, he said shop lighting could be reduced without any inconvenience and if domestic consumers avoided the use of radiators and all electric heating apparatus during peak hours, the possibility of power cuts would be considerably reduced. A representative of Leeds industrialists



Following last week's pictures of new factory installations, a good example of well-planned lighting comes from the Metalcraft Engineering Co. of Willoughby, N.S.W., where Crompton Parkinson two-lamp 4 ft fluorescent trough fittings have been used. The effect is enhanced by the use of light colours on machinery, structures and walls which helps to give a pleasant clean atmosphere

said he was not surprised to learn that 10% had proved inadequate but added that many firms would find it extremely difficult to achieve a 20% spread without introducing night shifts or some other form of staggered hours.

Christmas Lecture

SINCE 1946 the I.E.E. has organised a Christmas lecture on some aspect of electricity for the benefit of the older schoolchildren. This Christmas is no exception and Dr. W. Wilson, manager of the Development Laboratory of G.E.C. at Birmingham, is to speak on "Electric Current, Its Action and Nature." The Institution is making every effort to evolve a suitable technique for delivery to the children, so that the lecture will be both interesting and beneficial. Some 25 or 30 experiments will be carried out during the talk, illustrating the properties and applications of electric current, and lantern slides will be used to depict the effects of current.

All types of electric lamps will be covered by the lecture, as well as the principles of meters and motors and numerous other subjects. Dr. Wilson will address his young audience in the Lecture Theatre at Savoy Place, W.C.2, on January 2 at 3 p.m., and will repeat his talk at the same time on the following afternoon.

P.T. on Projector Lamps

AN application has been submitted to the Treasury asking that an order be made exempting projector lamps, not exceeding 250 W, from purchase tax. All these projector lamps, including those within classes A1 and G of E.L.M.A. classification, are at present chargeable with 33⅓% purchase tax.

The Mobile Board

NOT long ago we referred to the Yorkshire Electricity Board's new mobile exhibition units designed for use at agricultural shows (see November 9 issue), but they have now gone one better with their fleet of vans and trailers by the addition of a number of mobile service centres. Mobility and easy transport will undoubtedly prove invaluable assets in the extensive rural areas covered by the Board.

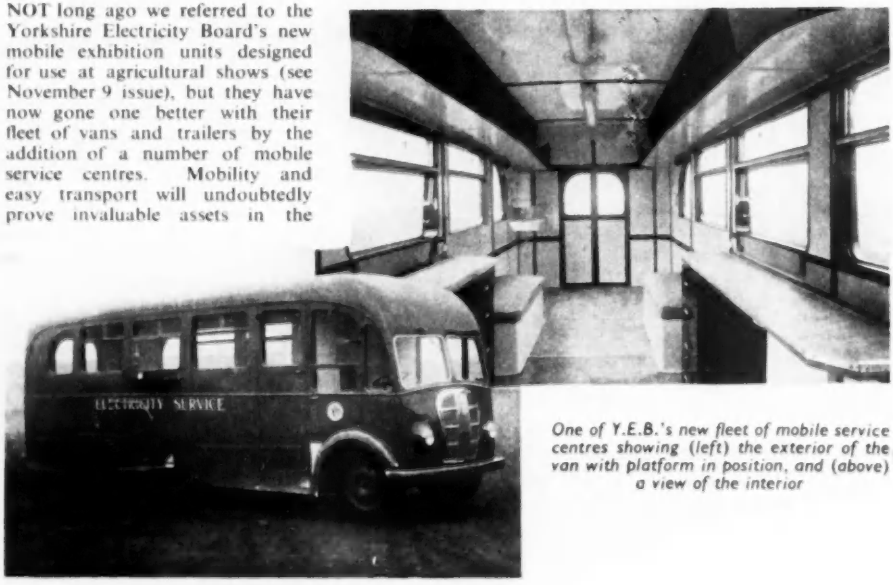
The new service centre is built on an Austin 22-seater coach chassis, and in addition to being a travelling showroom also has facilities for demonstrations and film shows. Payment of accounts can also be made, and for this purpose a small panel can be opened in the side and a platform, conveniently stowed under the body, is easily erected. Minor repairs to the smaller domestic appliances can also be undertaken. A few of these vans are already touring the area, not only visiting villages and hamlets which have been supplied with electricity, but also those which are included in the Y.E.B.'s Rural Development Plan.

Electric Galleys

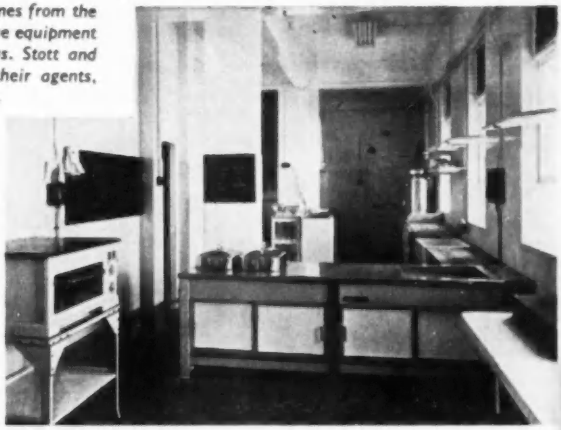
THE 17*th de Octobre*, which sailed from Southampton on her maiden voyage a short time ago, was the last of three Argentine ships built in British shipyards which were fitted out with complete electrical galley equipment manufactured by G.E.C. The main installation in the "kitchen" was a four-oven island range with 16 hot plates and a 4 ft sq bread and pastry oven. Electric grillers and toasters, and practically every type of electrical apparatus used in a modern kitchen, were supplied. The other two ships' galleys fitted out by the same firm were the *Presidente Peron* and *Eva Peron*, both completed within the past two years.

B.T.H. Were This Year's Hosts

EACH year one of the larger clubs in the London Business Houses Amateur Sports Association assumes responsibility for the organisation of the Presentation Dance of the Association. This



One of Y.E.B.'s new fleet of mobile service centres showing (left) the exterior of the van with platform in position, and (above) a view of the interior



This picture of an all-electric kitchen comes from the Mansion House, Nairobi, in Kenya. All the equipment was supplied by the Oldham firm of Jas. Stott and Co. (Engineers) Ltd., and fitted up by their agents, Naumann, Gepp and Co. Ltd.

function, at which the trophies and medals won during the track season are presented, is left entirely to the organisers as to when, where and how it is held.

This year the Athletic Section of the British Thomson-Houston Co.'s Willesden Social and Athletic Club were the hosts and to them we are grateful for a most pleasant evening.

Mrs. H. E. Cox, J.P., C.C., wife of the president of the B.T.H. Club, made the presentations. She herself received a bouquet from Miss Sheila King, British Schools High Jump Champion, 1950, and now a potential Olympic champion. The Mayor of Wembley, Ald. J. W. A. Billam, B.SC., C.C., as official host to the L.B.H.A.S.A. and chief guest at the dance, welcomed members and their guests back again to Wembley Town Hall and emphasised that the Town Council were proud of their associations with B.T.H.

Agricultural Shows are Beneficial

ACCORDING to the latest figures published by the Eastern Electricity Board, their policy of taking part in agricultural shows staged in the area has paid good dividends in the past season. Sales at these shows totalled nearly £21,000, but apart from this success, the opportunities of showing farmers the latest electrical methods and what electricity can do for country folk, fully justifies, in the opinion of the Board, the considerable cost of exhibits. The following table shows how each sub-area has played its part in the campaign.

Sub-Area	Sales to date £
Chilterns	2,600
Essex	5,450
Fens	3,400
Norfolk	3,600
Northmet	2,150
Suffolk	3,600

Quite apart from these already substantial sums, many orders received, particularly for large and expensive equipment, are slow to mature, and consequently total sales will possibly be larger than the present figure.

A Golden Age

BATTI-WALLAHS and their guests switched their interest from the ocean to calmer riparian surroundings at their November luncheon, when they entertained as their chief guest the Rt. Hon. Philip J. Noel-Baker, the Minister of Fuel and Power. Expressing his delight at having a change from fuel shortages and power cuts, the Minister entertained the Society with reminiscences of "The Cambridge of Rupert Brooke"—and with plenty of witty hits at the Oxford of that time.

A New Branch in S. Wales

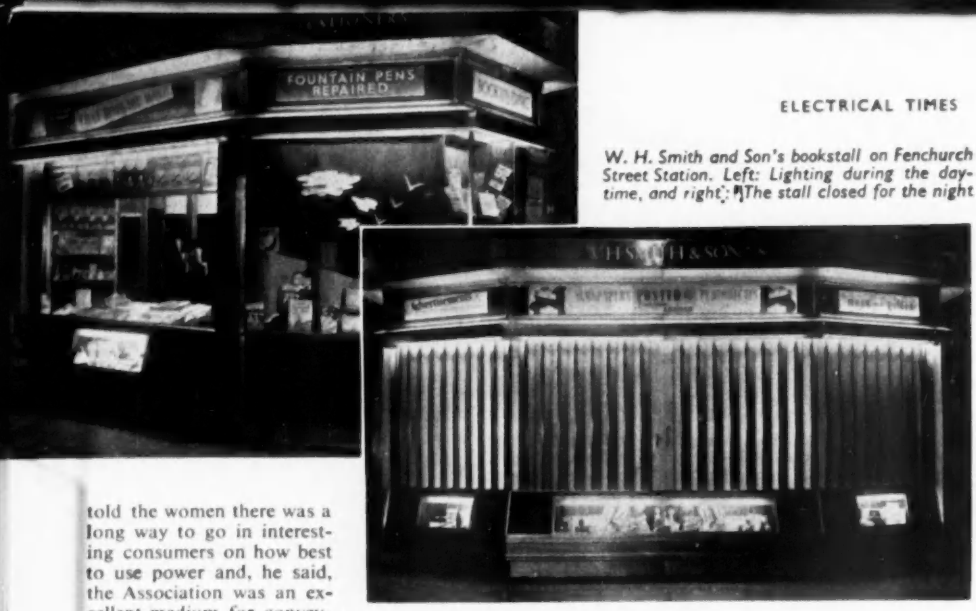
ELECTRICAL engineers in South Wales are shortly to have their own branch of the Engineers' Guild. The new branch's inaugural meeting will be held at the Mackworth Hotel, Swansea, next Wednesday, when Robert Chalmers, president of the Guild, will address members. It will be known officially as the South Wales and Monmouthshire Branch and membership is confined to Chartered Civil, Mechanical and Electrical engineers. Students and graduates will be admitted as Associates. Further information can be obtained from Mr. I. G. Evans, Pen-y-gryn, Upper Killay, Swansea.

1951 Calendars

WE have been the lucky recipients this week of two most attractive calendars, and want, not only to acknowledge them but also to reciprocate the good wishes they brought. Twelve coloured views of towns and country districts in various parts of England brighten the calendar of Brook Motors Ltd., while from across the Channel came reproductions of Dutch and Belgian paintings from Ateliers de Constructions Electriques de Charleroi. These coloured plates are a selection of works showing how the subject of "The Sea" was treated by various artists between the fifteenth and nineteenth centuries.

New Branch of E.A.W.

A NEW branch of the Electrical Association for Women has been formed at Ipswich. At the inaugural meeting, held in the Town Hall Council Chamber last weekend, the Mayoress, Mrs. Cyril Catchpole, became the branch's first president. Dame Caroline Haslett, founder and chairman of E.A.W., was present at the meeting, and Mr. C. T. Melling, chairman of Eastern Electricity Board,



W. H. Smith and Son's bookstall on Fenchurch Street Station. Left: Lighting during the daytime, and right: The stall closed for the night

told the women there was a long way to go in interesting consumers on how best to use power and, he said, the Association was an excellent medium for conveying the news. The opening meeting of the new branch will be held at Electric House, Ipswich, on December 11.

Bookstall's Fluorescent Lighting

THE new bookstall of W. H. Smith and Son on Fenchurch Street Station is now a familiar landmark to Londoners using this main-line terminus. The modern design, which is of aluminium alloy, veneered aluminium and Perspex, has been considerably enhanced by the installation of fluorescent lighting. The top canopy of the new stall has various sizes of fluorescent lamps concealed behind cut-out lettering which is backed by red transparent Perspex. Below are the advertising panels and magazine racks, all lit by a single row of lamps running round the stall between the two levels. The interior has standard fittings, and below the counter the showcases are lit by 2 and 3 ft fluorescent tubes. Erection and electrical installation was by Eustace and Partners Ltd., using Sieray fluorescent lamps, fittings and auxiliary equipment supplied by Siemens Electric Lamps and Supplies Ltd.

Arts and Crafts in February

THE National Arts and Crafts Exhibition, at the Horticultural Hall, S.W.1, will be held on February 15, 16 and 17, and not on January 11, 12 and 13, as it was incorrectly stated in these columns last week.

NEWS IN BRIEF

Twelve members of the Warrington Model Engineering Club were the guests of the directors of Pultra Ltd. recently. They were shown over the Broadheath Works by the chief technical superintendent, Mr. F. M. Shaw, and spent the evening watching the many uses of Pultra's micro-lathe.

A new B.B.C. studio at Bentinck's Buildings, Market Square, Nottingham, was opened by the Lord Mayor of Nottingham last Thursday. It has two microphones controlled from an adjoining cubicle and provides ample facilities for talks and discussions. Technical apparatus will be operated by Birmingham engineers.

A new plastic suitable for use in electric household appliances and as cable insulating material has been developed by the French Société Organico and is being marketed under the trade name Rilsan. Castor oil is the basic raw material of the new plastic, which can be manufactured in all colours, transparent and opaque.

The tenth International Heating and Ventilating Exposition, which is also known as the Air Conditioning Exposition, will be held at the Commercial Museum, Philadelphia, from January 22 to 26. The Exposition will bring together the latest ideas, practices and developments in the fields of heating, ventilating and air-conditioning.

G. Casperson Ltd., wholesale electrical merchants, of Park Square, Leeds, recently celebrated the 55th anniversary of their foundation. Presentations were made to five members of the staff whose service totalled 129 years.

The *Technical Review No.* 3, 1950, of the A.C.E.C. (Ateliers Constructions Electriques de Charleroi) is now available. We note that the publication will in future appear in English as well as in French. The English edition being published within three months of the French.

Lest there should be any misunderstanding concerning our reference last week to the lighting installation at Newbury Corn Exchange, R. J. Hewett (Newbury) Ltd. were responsible for the installation, as stated in our issue of August 10 under "Contracts Placed." It may have been inferred that the Southern Electricity Board were responsible.

Questions in Parliament

British Guiana H.E. Scheme

The Secretary of State for the Colonies was asked by Mr. Sorensen what financial and other steps had been taken to secure a Hydro-electricity service in British Guiana, with a view to ensuring a supply of electricity and enabling that colony to manufacture aluminium. Replying, Mr. Dugdale said preliminary investigations, such as measuring the water flow at individual falls and serial photography, were now being carried out.

Copper Supplies

When the Minister of Supply was asked whether he would announce the level at which sales of copper would be made by his Department in 1951, in view of the need of consumers to plan production ahead, Mr. Strauss, answered that an announcement would be made as soon as possible.

Fuel Economy

When Mr. Bartley asked the Minister of Fuel and Power whether, in view of the present coal situation, he would take steps to ensure that consumers of gas and electricity during the winter exercised the same economy as had already been enforced on users of coal and coke, Mr. Noel-Baker agreed, and stated that every economy will be needed this winter in the use of electricity and gas, as of coal and coke.

Subsequently the Minister was asked if he would prohibit shop window lighting, floodlighting and similar non-essential use of power after hours. He replied that all ways of conserving coal supplies were being examined; shop window and advertisement lighting was already prohibited at certain times.

Pollution of Rivers

During the discussion on the Rivers (Prevention of Pollution) Bill last week, Mr. Nugent drew attention to the problem of temperature, insofar as it was caused by generating stations. He believed that the setting up of large power stations now projected would cause serious difficulties in regard to temperature of river water. The Kingston power station when in full operation would require 100 million gallons of cooling water per day. Even with a river as big as the Thames, that would be a considerable burden on the river at times of low flow in the summer. A regulation had been agreed that the effluent temperature may not be raised above 100° F., but he doubted whether it would be possible to keep that figure, when the station was in full operation. If that trouble occurred on the Thames, how much worse it would be with other stations on smaller rivers. Later, Mr. G. Hutchinson also referred to the same subject, pointing out that behind the requirements of the new power stations was the urge of Government policy. It might be said that the Bill provided that raising the temperature of an effluent may be a form of pollution. But the difficulty would be to enforce the provisions against those authorities, which were linked so closely to Government policy.

Generation Methods

The question as to what progress had been made in research to develop cheaper methods for producing electricity; and what results had been obtained from the wind power experiment in the Orkneys, was raised by Mr. Murray. Replying, Mr. Noel-Baker said, a large number of scientists were engaged on this matter, and he understood, that very satisfactory progress was being made. The B.E.A. had substantially improved the efficiency of generation at steam power stations; this improvement was comparable with any achieved in other countries, and was likely to continue. With regard to the wind-power experiments in the Orkneys, a 100kW generator had been constructed for the North of Scotland Hydro-Electric Board, and would be installed on the site as soon as weather permits, meanwhile certain observations were still being carried out.

Owen Falls Project

On a question concerning the Owen Falls hydro-electric scheme, Uganda, Mr. Dugdale stated that it was hoped that the dam would be completed and the first four generating sets installed by 1953. The charges for the supply of electricity had not yet been scheduled. As to attracting industry to utilise the power supply to be available, discussions were continuing between representatives of the Uganda government and firms likely to be interested in establishing themselves out there. But the electrification of Kenya-Uganda railway was another question.

Power from North of Scotland

Col. J. R. H. Hutchinson, asked the Secretary of State for Scotland on what basis electric power was sold from Scottish hydro-electric schemes to the grid; and whether current had yet been sold from Loch Sloy. Replying, Miss Herbison explained that the supply the B.E.A. were bound to take from the North of Scotland H.E.Bd. was, unless otherwise agreed, paid for in accordance with rules laid down in the relevant Acts. The B.E.A. may also buy additional supplies at an agreed price. The supply being taken by the authority, including some from Loch Sloy, was sold in terms agreed between the parties. The recent disagreement, to which reference had been made, had now been cleared up. Mr. J. MacLeod then asked if the Minister was aware that, despite transmission charges, the B.E.A. could still buy at 15% less from the N. of Scotland Bd., and would she impress upon the Minister of Fuel and Power not to quibble over the price charged by the Board, as the country has an obligation to distribute electricity to the rural areas throughout the Highlands? To this, Miss Herbison answered that it was a matter in which the Minister of Fuel and Power does not intervene; it was arranged between the Board and the B.E.A.

Electric Supply News

Croydon

The new generating station is now feeding into the Grid, according to information given to a committee formed under the London and South East Regional Board for Industry. The first 52 MW set has already been tested several times, and the second unit is expected to be in commission before the end of the year.

Glasgow

The South West Scotland Electricity Board has announced that the programme for installation of certified meters in its Glasgow sub-area has now been completed in so far as it applies to alternating current meters, the total number of which is approximately 280,000. There are still about 3,000 d.c. meters in use in the area, but these consumers are being changed over to a.c. as quickly as circumstances permit.

Lerwick

Approval of the North of Scotland Hydro-Electric Board's constructional scheme for the erection of a new generating station at Lerwick, has now been given by the Secretary of State for Scotland. The scheme provides for the construction of a 6,000 kW diesel station at Lerwick to meet the growing demand in the Shetlands. There were no objections to the scheme.

Neath

The Public Health Committee has decided against the re-opening of Aberpergwm power station, Glynneath, by the South Wales Division of the B.E.A. unless a "permanent scheme" for the reduction of grit is arranged. It was reported that a temporary scheme, costing £800, had been outlined at a meeting of councillors, the National Coal Board and British Electricity Authority representatives. The power station was closed in 1945 after complaints about grit, but operated for certain periods until last May.

North of Scotland

To assist industries of Central Scotland during the present power shortage, the North of Scotland Hydro-Electric Board is prepared to supply the B.E.A. with up to 120 MW with an agreed number of units to be taken as the Authority think best. To achieve this output, the Board is utilising every available generating set, even some of the old units. The latter include the steam stations at Perth, Arbroath, and Inverness, and the diesel stations at Oban and Brora. The Board points out that the most inefficient of the sets cost 3d. or more p.u., which is more than they receive.

Power Station Extensions

The B.E.A. has received the consent of the Minister of Fuel and Power to extensions of the new Camarthen Bay power station, and the generating station at Cowes, Isle of Wight. In the case of the former station, two more 60 MW turbo-alternators, with nine 240 k lb/hr boilers are to be installed. At Cowes, there is to be a further 12,500 kW set and one 135 k lb/hr boiler.

South Wales

New tariffs, applying only in West Wales, and to take effect from the first meter reading in 1951, are announced by the South Wales Electricity Board. As the first step towards standardisation of charges a block tariff is adopted for domestic premises. Here, there is a primary charge of 4½d. p.u. for an initial number of units according to the size of dwelling. Where the number of rooms does not exceed two, 22 units will be charged at 4½d., from two to ten rooms there will be 10 units per room, at the primary rate, and for larger premises, 100 units plus five units for each room in excess of ten. All additional units will be charged at ¾d. p.u. Two other features of the new tariff will be welcomed by many consumers. The Board has decided to make no additional charge to prepayment consumers, while quarterly credit consumers will get a discount of 2½% by paying their account within 21 days. Although flat rate tariffs for lighting will no longer be available for domestic purposes, the old tariffs will continue to apply in appropriate cases for other purposes, notably lighting of commercial premises. As an interim measure, the unit charges under these flat rate tariffs is to be reduced to 6d. p.u. where they are at present above that figure. The area where these new tariffs will apply includes Pembrokeshire, Aberayron, Cardigan, Lampeter, and Carmarthen.

Stockton-on-Tees

Plans by the B.E.A. to construct an overhead line through Carlisle, Blaydon-on-Tyne to Rotherham were discussed at a meeting of the Rural Council. It was stated that the B.E.A. had been asked by the Air Ministry not to bring the overhead lines within three miles of the aerodromes at Thornaby and Middleton St. George. The proposed line would have to be taken over land at Eaglescliffe intended for housing developments.

LIGHTING SCHEMES

Coventry.—Twenty parallel streets in the city are to be used for large-scale experiments in lighting. The Gas and Electricity Boards will co-operate with equipment makers in an effort to help the corporation to decide how best to implement their decision to completely overhaul the street lighting.

Dewsbury.—A five-year plan for the improvement of the town's street lighting has been drawn up by Mr. C. H. Midson, lighting superintendent.

Goole.—A scheme for electric lighting in Pasture Road, involving 32 250-watt mercury vapour lamps, at a cost of £1,714, has been submitted to the M.o.T. for approval.

Hereford.—Experiments are being carried out with the latest systems of street lighting.

Portsmouth.—The T.C. is recommended to approve a scheme for additional decorative lighting on South Parade pier and sea front, at a cost of £4,300.

Company Activities

Aerialite Ltd.

For the year to May 31 last, consolidated trading profit amounted to £144,569, as compared with £146,157 for the preceding twelve months. The sum of £13,663 (*£13,432*) is set aside for depreciation, and £56,844 (*£61,299*) to taxation, leaving a net profit of £60,022 (*£59,554*), of which £58,046 (*£58,635*) is attributable to Aerialite. Preference dividend takes £1,195 (*£1,210*), and Ordinary dividends £27,500 (*£26,400*), leaving £78,693 carried forward.

Christy Brothers (Chelmsford) Ltd.

Ordinary shareholders have been offered 50,000 additional £1 Ordinary shares at 20/6d. each, in the proportion of one for three held. The new shares will rank for dividends as from January 1, and will be entitled to ¼ of any final dividend for the year to March 31.

Dictograph Telephones

For the year to August 31 last, the consolidated trading profits was £184,637, an increase of £6,717 over the figures for the previous twelve months. After deducting £48,399 (*£41,369*) for depreciation, £15,434 (*£14,411*) for directors' emoluments, £5,295 (*£4,437*) to employees' pension scheme, £4,500 (*same*), bonus to employees, and allowing £60,496 (*£63,128*) for taxation, the group net profit is £50,513 (*as compared with £50,075 for 1948-49*), of which £50,117 (*£47,331*) relates to the parent company. Transferred to general reserve £20,000 (*£10,000*), Preference dividend takes £2,750 (*same*). Ordinary 20% £24,750 (*same*), leaving £23,704 (*£21,587*) carried forward.

Engineering and Lighting Equipment Co.

Trading profit for the year ended March 31 was £33,743 (*£23,433*), and the net profit after allowing for depreciation, taxation, etc., was £17,222 (*£14,811*). The dividend on the 7% Preference for 3½ years ended December 31, 1949, amounting to £15,887 (*gross*) has not been paid.

Perak-River Hydro Electric Power Co.

Revenue from the sale of current, etc., for the year to July 31, was £971,338, as against £827,357 for the previous 12 months. Malayan expenses absorb £209,329 (*£244,563*), distribution expenses £121,105 (*£117,091*), and management £45,658 (*£40,127*), leaving £595,246 (*£425,476*). After adding dividends, charging London administration expenses, £111,575 (*£70,000*) to depreciation, and charging U.K. and Malayan income tax £220,000 (*£150,000*), plus other items, the net profit is £147,029 (*£85,863*). To contingencies reserve £100,000 (*£75,000*), fuel equalisation reserve £40,000 (*nil*), leaving £58,327 (*£51,298*) carried forward.

Phoenix Telephone & Electric Holdings

It is proposed to request permission to deal in the 5½% First Preference and the Ordinary shares. A number of the former will be available at about 20/9d. and a few of the latter at approximately 7/6d. each.

S. Smith & Sons (England)

Consolidated profit for the 53 weeks ended August 5, before taxation, was £1,101,580 (*£860,143 for the previous year*). Taxation absorbs £681,400 (*£513,425*), leaving a net profit £420,180 (*£346,718*).

Dividends Declared

Allied Ironfounders Ltd. Interim Ordinary dividend of 6¼% (5%), payable on January 1.

George Kent. Interim dividend of 3% (*same*).

Hick Hargreaves and Co. Interim of 2% (*same*).

Lightfoot Refrigeration. Interim of 3% (*same*).

Lisbon Electric Tramways. Interim dividend of 2½%, tax free, payable on January 1.

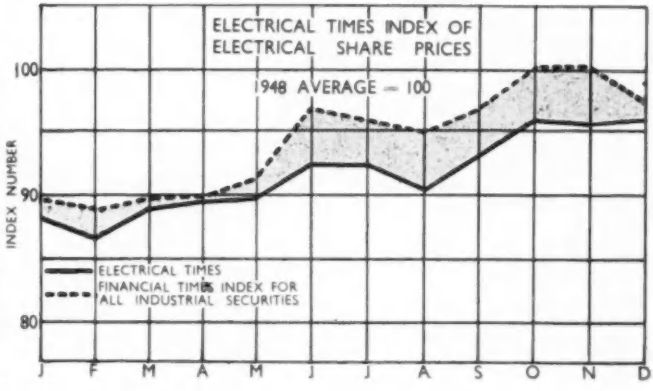
Louis G. Ford. Interim dividend of 10% (*same*).

Oldham and Son. Interim of 15% (*same*).

Peto Scott Electrical Instruments. The directors have decided not to pay a dividend for the year to March 31 last. Consolidated net loss is £8,558 (*as against a profit of £7,625 for the previous period*).

Pye (Ireland). Interim of 2½% (5%), on capital increased by 100% scrip bonus.

Electrical share prices have again remained steady, and as a result of November trading the "Electrical Times" index figure has changed only 0·5 point to become higher at 95·7. This maintains the high level reached in October. The "Financial Times" index for all industrial shares has fallen to 97·4% of the average of 1948, which is the base year used for these financial calculations


ELECTRICAL TIMES INDEX OF ELECTRICAL SHARE PRICES
1948 AVERAGE = 100
INDEX NUMBER
100
90
80
ELECTRICAL TIMES
FINANCIAL TIMES INDEX FOR ALL INDUSTRIAL SECURITIES
J F M A M J J A S O N D

Commercial Information

CONTRACTS OPEN

HOME

Dec. 8.—Belfast T.C. Supply and erection of vertical spindle centrifugal type drainage pumps, pipework and equipment at Harbour power station. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-on-Tyne 1. Deposit £5 5s. (See Nov. 2 issue.)

Dec. 8.—Burnley T.C. Complete wiring installation of 32 houses on Brunshaw estate. Borough Engineer, 22-24 Nicholas St. Deposit £1 1s.

Dec. 8.—Lancashire. Electrical installation at proposed school clinic and child welfare centre at Droylesden. Applications by above date to County Architect, County Offices, Preston. Deposit £2.

Dec. 8.—Manchester. Supply of street lighting lanterns, auxiliary equipment, time switches and steel standards and poles for period up to Dec. 31, 1951. City Surveyor, Town Hall, Manchester 2. (See Nov. 23 issue.)

Dec. 9.—Saddleworth (Yorks) U.D.C. Installation of new wiring system to heated digestion plant and renewal of electric wiring to existing installations at Greenfield Sewage Disposal Works. Consulting engineer, W. Foster, 5 Branksome Av., Prestwich, Nr. Manchester.

Dec. 9.—Warrington. Supply and erection of three d.w.f. pumps each of 600 g.p.m. and two storm water pumps each of 2,000 g.p.m. with electric motors and switchgear. Borough Surveyor, Town Hall. Deposit £2 2s.

Dec. 11.—Dewsbury T.C. Lighting installation and structural alterations, building of external lift well for installation of passenger lift in Victoria Hall. Separate contracts. Borough Architect and Buildings Surveyor, Town Hall.

Dec. 11.—Dublin. A.C. motor-d.c. generator set direct coupled on combination bed plate. D.C. generator, compound wound, continuously rated 5 kW, 110V. Technical Schools, Bolton St., Dublin.

Dec. 11.—Fife. Electrical works in four houses at Lebanon, Cupar. Surveyors are Wilkinson and Lowe, 2a Chalmers St., Dunfermline.

Dec. 11.—Hemel Hempstead. Electric wiring to 18 existing houses at Leverstock Green. A. H. Turner, Borough Engineer, Market Sq., Hemel Hempstead.

Dec. 11.—Kildare. Installation of fluorescent lighting and fittings in certain offices of County Council. J. J. Mullaney, Runai, Courthouse, Naas.

Dec. 11.—Sowerby Bridge U.D.C. Electrical installations in 75 houses on four estates and under separate contracts of 35, 18, 12 and 10 houses. J. Normanton, Architect, Council Offices. Deposit £1 for each contract.

Dec. 11.—West Riding. Electrical installation of drive lighting and main supply at Brettonhall Tech. College. County Architect, "Bishopgarth," Westfield Rd., Wakefield. Deposit £1 1s.

Dec. 11.—York. Electric lighting, heating, cabling installations, etc., in reconstruction of Fulford pumping station. Chas. J. Minter, City Engineer and Architect, Guildhall. Deposit £2.

Dec. 12.—Gillingham T.C. Electrical installation in shops, maisonettes and flats in Twydale neighbourhood. Borough Engineer and Surveyor, Municipal Buildings.

Dec. 12.—Salford. Supply and installation of six refrigerators, each of 15 cu. ft., for day nurseries. Tenders to H. H. Tomson, Town Clerk, Town Hall, Salford 3.

Dec. 13.—Grimsby T.C. Electrical installation in erection of Highfield secondary grammar school and Chelmsford Ave. modern school. Names to be submitted by above date to J. V. Oldfield, Borough Engineer and Surveyor, Municipal Offices, Town Hall Sq. Deposit £5.

Dec. 13.—Bournemouth T.C. Supply and erection of a neon sign installation at the Pavilion, Westover Rd. Borough Architect, Town Hall. Deposit £1 1s.

Dec. 15.—Edinburgh. Electric light and power installation in primary school at The Inch, Liberton. City Architect's Office, City Chambers, Edinburgh.

Dec. 15.—Harrow U.D.C. Installation of lanterns and 140 W sodium vapour lighting along a total of 5½ miles. Also 3/80 W fluorescent lighting at various shopping centres. Council's Engineer and Surveyor, H. W. Rackham, Council Offices., Uxbridge Rd., Stanmore. Deposit £2 2s.

Dec. 15.—Manchester. Electrical installation in 38 shops, maisonettes and garages. City Architect, Town Hall. Deposit £1 1s.

Dec. 16.—Ince-in-Makerfield U.D.C. Electrical installation in 14 bungalows on Petticoat Lane site. Surveyor is R. Lewis. Deposit £1 1s.

Dec. 16.—Swinton and Pendlebury. Supply and erection of concrete columns, bracket arms and wiring, and supply of lanterns, lamps and auxiliary gear for Manchester-Bolton (A.666) Rd. Borough Engineer and Surveyor, Town Hall, Swinton, Lancs. Deposit £2 2s. (See Nov. 16 issue.)

Dec. 18.—Belfast. Electrical installation in Community Centre at Finaghy, Northern Ireland Housing Trust, 12 Hope St., Belfast. Deposit 10s.

Dec. 18.—Lees U.D.C. Supply and erection of 18 reinforced concrete columns and lanterns and 140 W sodium discharge lamps for section of High Street; also for 21 columns, lanterns, and lamps for part of Huddersfield Rd. Council Offices, Cross St., Lees. Deposit £2 2s.

Dec. 18.—Pudsey T.C. Electrical work in erection of 42 houses on Southroyd Park site. Borough Surveyor, Town Hall. Deposit £2 2s.

Dec. 28.—Winchester. Supply and erection of two diesel engines (each 100 h.p.) and a variable speed electric motor (100 h.p.) for driving 3 existing pump sets. City Engineer, Guildhall. (See Nov. 30.)

Dec. 30.—Haslemere U.D.C. Supply and erection of electric motor of approximately 60 b.h.p. to drive multi-stage centrifugal pump, with starting and automatic gear. Engineer and Sur-

veyor to the Council, Council Offices, Museum Hill (See Nov. 30 issue.)

Jan. 2.—Chester. Renewal of electrical installation in Town Hall. Consulting Engineers are Sloan and Lloyd Barnes, 34 Castle St., Liverpool 2. (Advertised in this issue.)

Jan. 3.—Wandsworth. Supply of electric lamps and electrical works for periods up to April 1, 1951. R. H. Jerman, Town Clerk, Municipal Buildings, S.W.18.

Jan. 5.—Belfast. Electricity dept. require supplies of materials, including static transformers, 6,600-V armour-clad switchgear, overhead line materials, copper covered and rubber insulated cables, street lighting fittings and ancillary equipment, cookers and lamps. Dept.'s address is East Bridge St., Belfast. (Advertised in this issue.)

No date stated.—Aberdeen. Electric lighting for proposed school house at Dyce for C.C. George Watt and Stewart, architects, 214 Union St.

Jan. 8. — Billingham U.D.C. Street lighting works as part of Roseberry Rd., development scheme. Eric G. Lediard, Chartered Civil Engineer, 4 Eldon Square, Newcastle-on-Tyne 1. Deposit £5 5s.

Jan. 12—Kidderminster. Installation of new radio equipment for (approx.) 90 beds at Kidderminster General Hospital. Hospital Administrative Officer, Mill St., Kidderminster. (See Nov. 23 issue.)

OVERSEAS

*Details of items marked * may be obtained on application to Room 1076, Board of Trade, Thames House, North Millbank, S.W.1, quoting reference.*

Dec. 15.—S. Rhodesia. Supply of storage batteries for Central Mechanical Equipment Dept. Secretary to Tender Board, P.O. Box 123, Causeway.

Dec. 19.—Egypt. Cairo Electricity and Gas Administration require underground 3-core cable line approx. 28·2 kilometres in length between Cairo North Power Station and Egyption Broadcasting Station at Abn Zabaal, and 11 kV switching station to be erected at Ameria pumping station. B.o.T. (Ref. CRE (IB) 71517/50).*

Dec. 19.—Melbourne. Dept. of Civil Aviation, 522 Little Collins St., invite tenders for 38 dual diversity communication receivers and sets of maintenance spare parts.

Dec. 19.—Pakistan. Dept. of Supply and Development, Frere Rd., Karachi, invite tenders for double cotton covered copper electric wire for armature winding.

Jan. 5.—Canada. 63 a.c. distribution panel boards for 120/208 V, complete with all necessary component parts for Yonge Street Subway, Toronto. Toronto Transport Commission, 35 Yonge St. B.o.T. (Ref. CRE (IB) 71845/50)*.

Jan. 12.—Brisbane. Four circulating water pumps each capable of supplying 13,000 g.p.m., 3,300 V electric motors and all accessories for a power house at Brisbane. Copies of specification from Town Clerk, Brisbane City Council, City Hall, at 10s. 6d. each.

Jan. 16.—Melbourne. 94,500 fuses of various types and 8,600 fuseholders, for radio and radar equipment. Dept. of Civil Aviation, 522 Little Collins St. B.o.T. (Ref. CRE (IB) 72052/50)*.

Jan. 16.—Sydney. Australian Dept. of Civil Aviation require supply of fuses for radio and radar equipment. Details from Australia Hse., London.

CONTRACTS PLACED

Bexley T.C. Sodium street lighting in Okehampton Cres., parts of Bourne Rd. and Upton Rd., and on Halcot estate, Revo Electric Co., Ltd., £5,139 (provisional).

B.E.A. Contracts for equipment during November amounted to £1,464,029. 132 kV transformers at Meaford power station, Stoke-on-Trent, B.T.H.; 415 V switch and contactor gear at Keadby power station, Lincs, Contactor Switchgear Ltd.; 11 kV 1,000 MVA switchgear for Nechell's "B" power station, Birmingham, G.E.C.; 60 MVA 132/133 kV transformers and earthing transformers for Watford substation, Herts, British Electric Transformer Co.; and two 45 MVA 132/133 kV transformers and earthing transformers for Howarden substation, Flint, C. A. Parsons and Co. Ltd.

Dorset. Rewiring of South Rd. primary school. Edwards and Co., Boscombe, £1,431.

Hull. Electrical installations in 34 houses in Dunstan Rd., Howdenshire Electrical Contractors Ltd.

Newcastle-on-Tyne. Electrical installation at Montagu primary school, T. Mitchelson (Electrical) Ltd., £5,233.

Your Queries — Answered

"Lico" adjustable plugs, makers of? N.S.—London Instrument Co. Ltd., Newnham Mill, Cambridge. (19083)

"Kennedy" bender, makers of? T.E.—Wm. Kennedy, Station Works, Warwick Rd., West Drayton. (19087)

Water heaters of the instantaneous type, makers of? H.W.—Santon Ltd., 18 Lowndes St., London S.W.1; James Stott and Co. (Engineers) Ltd., Vernon Works, Oldham; Harbrix Industries Ltd., Rock Ferry, Birkenhead; Campbell Engineering Co., Ltd., Bromley, Kent. (19093)

"Vega" washing machines, makers of? C.W.—These were made by Hunting Aviation Ltd., a firm which went out of business about a year ago. The Henderson Safety Tank Co. Ltd., Elstree Way, Boreham Wood, Elstree, Herts, are undertaking repairs. (19098)

"Browleco" soldering iron, makers of? E.B.—Brownings Electrical Co. Ltd., Boleyn Castle Green St., E.13. (19106)

"Mixette" mixer, makers of? E.S.—Pripar Electrical Products Ltd., Fleet Works, Fleet St., Coventry. (19109)

ANSWER WANTED

Rubber-covered E.S. lampholder with porcelain interior marked "British made," makers of? B.C. (19113)

The above are selected from questions we have answered this week. If you have a query, send it to us.

TRADE NOTES

B.E.A.M.A. Members. New members of the Association are: Medical Supply Association, Ltd. (X-ray apparatus section); Kenwood Manufacturing Co. (domestic appliance section); Smart and Brown, Ltd. (accessories section); Manchester Oil Refinery, Ltd. (insulations section); Partridge Wilson and Co. (transformer section) and Victor Products (Wallsend), Ltd. (motor control gear section).

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

G. A. Bird & Co. Ltd., 140 London Rd., Leicester. Electrical engineers and contractors, etc. Cap.: £2,000. Dirs.: G. A. Bird, C. S. Day and A. P. Hilton.

Burrell's (Leeds) Ltd., 137 Hetton Rd., Leeds 8. Manufacturers of and dealers in electrical apparatus, machines, accessories and equipment of all kinds, etc. Cap.: £3,000. Dirs.: E. L. Burrell and Mrs. P. E. Burrell.

H. J. Gornall & Co. Ltd., Sutton St., Newcastle, Staffs. To take over business of an electrical engineer and contractor carried on at Butcher Row, Shrewsbury, by Herbert J. Gornall. Cap.: £5,000. Dirs.: E. Bloor and H. J. Gornall.

Bailey Refrigeration Services Ltd. Cap.: £1,000. Dirs.: S. Bailey and Mrs. M. O. Bailey, 18 Fairholme Av., South Shields.

Charmony Ltd. No. 2 Works, Spencer Hill Rd., Wimbledon, S.W.19. Manufacturers of and dealers in lamps, reflectors, bells, etc. Cap.: £1,000. Dirs.: E. W. Grote and Doris M. Grote.

Lawrences Liverpool Ltd., 61 Byrom St., Liverpool 3. Wireless, television, telephonic and telegraphic engineers, etc. Cap.: £100. Dirs.: A. W. Owers and Rose M. Smith.

T. S. Skillman and Co. Ltd., 6 York Bldgs., Adelphi, W.C.2. Electrical engineers and contractors, etc. Cap.: £10,000. Dirs.: T. S. Skillman, D. H. Piper and H. J. H. Wiseman.

Lomas and Whitaker Ltd., Vicarage Lane, Brockworth, nr. Gloucester. Designers and manufacturers of and dealers in genera , constructional, mechanical and electrical engineering. Nom. cap : £1,500. Dirs.: not named Subs.: K. L. Whitaker, Red Roofs, Druid Rd., Stoke Bishop, Bristol, and T. Lomas.

PRICES OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	202 0 0	£196 0 0
Delivered in 2nd and 3rd month after order	215 10 0	—
Delivered in 4th, 5th and 6th month after order	217 0 0	—
LEAD, good soft pig (foreign)	136 0 0	136 0 0
" " " "English" quality	137 10 0	
Delivered in 2nd and 3rd month after order, plus	7 0 0	
TIN (99-99.75%) (Cash)	1090-1100	—
" (3 months)	1000-1010	—
ALUMINIUM, commercial purity (del.)	120 0 0	—
ZINC	151 0 0	140 0 0
ARMOURING:		
Galv. Steel Wire (0.104 in.)	45 10 0	—
Mild Steel Tape (0 04 in.)	26 0 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Battery Service (Worcester), Ltd. Resolution for voluntary winding-up passed at meeting on Nov. 17. R. B. Smith of Armitage, Smith, Jackson and Co., 3 Alfred St., Boar Lane, Leeds 1, appointed liquidator, creditors should send particulars by Dec. 20.

Auto Electrical Service Co. (Reading), Ltd. Meetings of members and creditors will be held at 185-8 High Holborn, W.C.1, on Dec. 29 at 11 and 11.15 a.m. respectively, to receive liquidator's report.

Em-Vee Electric Co., Ltd. Meetings of members and creditors to be held at 23-26 Broad St. Ave., E.C.2, on Dec. 29 at 11.30 a.m. and 12 noon respectively, to receive liquidator's report.

Intended Dividend

London. J. M. Freemar and Co., Ltd., trading as electricians and dealers in hairdressing appliances at 52-54 High Holborn, W.C.1. Last day for receiving proofs, Dec. 13. Liquidator is Torquil J. M. Macleod, 4 Bucklesbury, E.C.4.

Appointment of Liquidators

Public Utilities (Electric), Ltd., 820-6 Salisbury Hse., Frasbury Circus, E.C.2, have appointed John Baldock, Midland Bank Chambers, Westgate, Grantham as liquidator.

Dunedin Holdings (London), Ltd. Proprietors of Epheta Manufacturing Co. of 64 Newman St., W.1. Liquidator is David Morgan (with committee inspection) of 100 Park St., Grosvenor Sq., W.1.

Partnership Dissolved

Rochdale. Arthur K. Muffet and Richard Rigby, trading as Easihome Electrical Co. (Rochdale), at 132 Yorkshire St., Rochdale. Partnership dissolved as from Aug. 18. All debts to be received and paid by Richard Rigby, who will continue the business.

BANKRUPTCY ACTS

Release of Trustee

Leicester. John W. Griffin, trading as radio and electrical dealer at 2 Hinckley Rd., Earl Shilton. Trustee, E. E. V. Rowley, Chartered Accountant, 20 Friar Lane, Leicester. Date of release, No. 9.

Appointment of Trustee

Bangor. David L. Smith, electrical engineer trading at Midland Bank Chambers, Cefn Rd., Old Colwyn. Trustee is Ronald Parkyn Booth, of 5 Rumford Place, Chapel St., Liverpool 2.

Order on Application for Discharge

Stafford. Percy T. Bradley, trading as radio engineer at 1 The Arcade, Stafford. Discharge granted subject to bankrupt's consent to judgment against him for £400.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Atlas. 688,881. Class 9. Electrical appliances being parts of wiring installations, for use in the controlling of electrical discharge lighting apparatus. Thorn Electrical Industries, Ltd., 10 Judd St., W.C.1.

Stabilag. 682,616. Class 11. Heating jackets and coverings employing electric heating elements. F. A. York, 1 Broad St. Buildings, Liverpool St., E.C.2.

Rotaneon. B688,520. Class 9. Neon electric advertising signs. S. Trup & Co., Ltd., 42 Whadcoat St., London N.4.

Westar. 687,983, Class 10. Electric instruments and apparatus for aiding the deaf. Western Electric Co. Ltd., Liberty House, Regent St., W.1.

BUSINESS PROSPECTS

HOME

Aberdeen. Plans approved for erection of 114 houses on Kincorth estate, 50 in Northfield scheme, and tenders are to be invited for erection of 40 houses on another part of Kincorth estate.

Ayr T.C. 76 houses to be erected at Craigie.

Belfast. Council to erect primary school on Glenard estate.

Bellingham (Northumberland). Forestry Commission planning erection of 1,000 houses in this area.

Birkenhead. Erection of new junior C. of E. school at estimated cost of £50,000 has been approved.

Bolton T.C. Erection of 60 flats and houses, and 44 bungalows and houses on Johnson Fold estate, and of 20 houses and flats on Willows Lane estate. Housing Director, Town Hall.

Bournemouth T.C. Erection of 38 houses at Longbarrow estate. Borough Architect, Town Hall.

Bradfield (Berks). R.D.C. approved erection of 32 houses at Theale, 12 at Bucklebury, and 16 at Southend.

Bridgend U.D.C. Erection of 34 houses on West House site. Engineer and Surveyor of the Council, D. J. Amos.

Bridlington T.C. To apply for sanction to borrow £19,138 for erection of a factory.

Coulsdon and Purley (Surrey) U.D.C. Scheme approved for erection of 90 houses on various sites and 13 at Coulsdon and Old Coulsdon.

Dartford. Erection of 62 houses on Temple Hill estate. Thomas Armstrong, Town Clerk, Town Clerk's Office, High St.

Dewsbury T.C. Tenders invited from all trades for conversion of Ash Tree House into a children's home. Borough Architect and Buildings Surveyor, Town Hall.

Dundee. Plans approved for erection of 378 houses on Douglas, Angus and Craigie housing scheme and 242 at Mains of Fintry at estimated cost of £500,000.

Ellesmere U.D.C. Construction of 36 houses on Oswestry Rd. site. W. H. Davis, Council's Surveyor, 2 Willow St.

Greenwich. Council recommended to approve installation of electricity in specified gas-lit dwellings at estimated cost of £9,124.

Hebburn-on-Tyne. U.D.C. is to build 190 houses on Campbell Park site. Also 60 houses on Mill Lane site.

Hindley (Lancs) U.D.C. Erection of 32 houses on Castle Hill estate. Engineer and Surveyor, Town Hall.

Kensington. It is understood that tenders are to be invited for erection of 40 flats, being first phase of 72 flats, at Walmer Rd.

Lancashire. Approval has been received for school programme consisting of £1,155,280 for primary and secondary schools, £129,000 for further education, and £60,000 for special services. 13 new schools are proposed.

Liverpool. Construction of 78 at Smithdown Lane, 54 at Garston, and 8 houses on Cantril Farm estate. City Architect and Director of Housing, Blackburn Chambers, Dale St., Kingsway.

Llanelly. Erection of 60 houses on Cefncaeau North estate in two contracts of 34 and 26 houses. J. E. Thomas, Borough Architect, 5 Goring Rd.

Lowestoft T.C. Erection of 72 houses on Whitton estate in groups of 26, 24 and 22. Borough Engineer's Office, Town Hall.

Maidenhead T.C. Erection of 36 houses on Curls Lane estate. C. T. Read, Borough Engineer and Surveyor, 14 Cranfurd Rise.

Middlesbrough T.C. Erection of 86 houses on Berwick Hills site. Borough Engineer and Surveyor.

Motherwell and Wishaw T.C. Dean of Guild Court has approved plans for erection of 104 houses on a site at North Motherwell.

Oxfordshire. C.C. approved erection of secondary modern school at Bicester at total cost of £126,000, including £4,300 for installation of electricity.

Penrith. U.D.C. to build 32 houses on Scaws estate. Council's Architect is F. E. B. Blanc.

Portsmouth T.C. Erection of 27 flats at Paulsgrove, 18 at River St., and 12 at St. Faith's Rd. City Architect, Municipal Buildings 1 Western, Parade.

Reigate. C.C. approved erection of junior and infants' school, secondary school and primary for infants and junior mixed.

Rhondda U.D.C. Erection of 130 houses at Maerdy. Council's Housing Architect, C. Gingell, 13 Ystrad Rd., Pentre. Rhondda.

Rushden (Northants) U.D.C. Erection of 38 houses on Upper Queen St. estate. Engineer and Surveyor, Council Buildings.

St. Helens. Layout scheme approved for 60 houses at Ashtons Green, 40 flats and 146 houses at Broad Lane.

Stockton-on-Tees. Local Authorities to discuss holding of illumination display at Redcar for Festival of Britain.

Stratford-on-Avon R.D.C. Tenders to be invited for erection of 54 houses on Wellesbourne site.

OVERSEAS

Egypt. Khedivial Mail Line, S.A.E., urgently require six portable electric welding sets, 2 portable air compressors with accessories and electric drills of 110 and 220 V. Quotations to be submitted to 10 Haymarket, S.W.1.

India. Tenders are expected to be invited shortly for generating plant to generate 10,000 kVA for the Konar scheme. In addition it is anticipated that tenders will be sought in March or April for similar plant for the Maithon scheme. The latter will be required to generate between 30,000 and 40,000 kVA.

U.S.A. Rad-el-co Manufacturing Co., of 7880 Garfield Boulevard, Cleveland 25, are anxious to obtain television lead-in wire described as 300 ohm twin conductor, each wire being polyethelene insulated with seven strands of size 28 copper wire. Interested U.K. firms should contact Mr. C. B. Callihan of the above company.

The Carnegie Radio Co., of 2536 Prospect St., Cleveland, also want some equipment for distribution throughout the U.S. Mr. C. C. Lewis should be contacted at above address.

Also Mr. L. J. Cuthbertson, 209 West Prairie Av., Girard, Kansas, wishes to contact U.K. manufacturers of switches, electric motor starters, or parts of same which could be assembled in America. He is particularly interested in electric sockets, brass shell type, push through or similar switch, and electric cord sets.

MEETINGS TO NOTE

THURSDAY, DEC. 7

INSTN. OF WORKS MANAGERS (Bristol Branch).—"Sales and Marketing." Royal Hotel. 7.15 p.m.

WOMEN'S ENGRNG SOC.—"The Festival Concert Hall." 35 Grosvenor Pl., S.W.1. 7 p.m.

BRIT. INSTN. OF RADIO ENGRS. (Scottish Section).—"Vacuum Engineering as applied to Electronics." D. Latham. Heriot Watt Coll., Edinburgh. 6.45 p.m.

BRIT. INSTN. OF RADIO ENGRS. (N.W. Section).—"High Fidelity Reproduction." H. J. Leak. Coll. of Technology, Manchester. 6.45 p.m.

I.E.E. (London).—"Control of Hydro-Electric Plant." A. C. H. Frost and W. Brittlebank. Savoy Pl., W.C.2. 5.30 p.m.

I.E.E. (E. Midland Centre).—Faraday Lecture: "Lamps and Lighting: Record of Industrial Research." L. J. Davies. Albert Hall, Nottingham. 7.15 p.m.

A.S.E.E. (S. London Branch).—"Prevention of Electrical Accidents, II." Col. Emerson, Inspector, Min. of Labour and National Service. Cafe Royal, North End, Croydon. 8 p.m.

FRIDAY, DEC. 8

A.S.E.E. (Bristol Branch).—"Mineral Insulated Cables." A. H. Dyer. Grand Hotel. 7.30 p.m.

A.S.E.E. (Crewe Branch).—"The I.E.E. Regulations (12th edition)." H. Neville and R. Nicholls. Crewe Arms Hotel. 7.30 p.m.

A.S.E.E. (Nottingham Branch).—"Mineral Insulated Copper-covered Cable." G. Gilchrist. Elect. Showrooms, Smithy Row. 7.30 p.m.

I.E.E. (N.E. Students Section).—"Switchgear for E.H.V. Transmission." R. W. Gee. King's College, Newcastle. 6.30 p.m.

I.E.S. (Cardiff Centre).—"Stage Lighting." E. Faraday. S. Wales Elect. Board, The Hayes. 5.45 p.m.

INSTN. OF HEATING AND VENTILATING ENGRS. (Birmingham Branch).—Annual dinner. Midland Hotel.

I.E.E. (London Education Circle).—Discussion on "How best to introduce the *ab initio* Use of the M.K.S. System to Students." Savoy Pl., W.C.2. 6 p.m.

I.E.E. (S. Midland Centre).—"Brabazon Aircraft." A. E. Russell. James Watt Memorial Inst., Gt. Charles St., Birmingham. 6 p.m.

ELECT. POWER ENGRS.' ASSOC.—"Current Transformers for Measurement." A. Hobson. Caxton Hall, Westminster. 6.30 p.m.

SATURDAY, DEC. 9

I.E.E. (N. Midland Students' Section).—"Development of the Induction-type Energy Meter." C. Adamson. Yorks Elect. Board, Sunbridge Rd., Bradford. 2.30 p.m.

MONDAY, DEC. 11

BIRMINGHAM ELECT. CLUB.—"Some Developments in Domestic and Commercial Refrigeration." H. Brecknock.

I.E.E. (N.E. Centre).—"Distribution Planning of an Area Board." G. O. McLean. Neville Hall, West gate Rd., Newcastle. 6.15 p.m.

I.E.E. (Reading).—"Television Engineering." D. C. Birkinshaw. Great Western Hotel. 7 p.m.

I.E.E. (N. Staffs Sub-Centre).—"Cost and Efficiency of Earthing on Low and Medium Voltage Overhead Line Systems." L. Gosland. Midlands Elect. Board showrooms, Stoke. 7 p.m.

I.E.E. (Rugby Sub-Centre).—"Some Experience with British A.C. Network Analyser." G. Lyon. E. Midlands Elect. Board showrooms, High St. 6.30 p.m.

I.E.E. (Western Centre).—"Development and Design of Electrical Control Gear for Machine Tools." A. R. H. Thorne. S. Wales Inst. of Engrs., Park Pl., Cardiff. 6 p.m.

ELECT. POWER ENGRS.' ASSOC. (London Group). Discussion on Power Station Troubles. Caxton Hall, S.W.1. 7 p.m.

TUESDAY, DEC. 12

I.E.S.—"Development of the Tungsten Lamp." B. P. Dudding. Lighting Service Bureau, 2 Savoy Hill, W.C.2. 6 p.m.

I.E.S. (Stoke-on-Trent Group).—"Lighting of Architecture." G. Grenfell-Baines. 31 Kingsway, Stoke. 6 p.m.

I.E.E. (London Measurements Section).—"Effect of Friction on Behaviour of Servo Mechanisms at Creep Speeds." J. G. L. Michel and A. Porter. Savoy Pl., W.C.2. 5.30 p.m.

I.E.E. (N. Midland Centre).—"Phase/Neutral System of Supply for Rural H.V. Distribution." G. T. Garwood and G. J. Websdale. 1 Whitehall Rd., Leeds. 6.30 p.m.

I.E.E. (N.W. Centre).—"Control of Hydro-Electric Plant." A. C. H. Frost and W. Brittlebank. Engineers' Club, Albert Sq., Manchester. 6.15 p.m.

I.E.E. (N. Ireland Centre).—"Cost and Efficiency of Earthing on Low and Medium Voltage Overhead Line Systems." L. Gosland. Queen's University, Belfast. 6.45 p.m.

A.S.E.E. (S.W. London Branch). "Colliery Electrification." R. A. Frith; "Industrial Psychology and the Electrical Engineer," G. S. Gorringe. St. George's Hall, St. George's Rd.,Wimbledon. 8.15 p.m.

WEDNESDAY, DEC. 13

NORTHAMPTON ELECT. ASSOC.—"Technicalities of Film Production, both Sound and Vision." W. S. Cator. 7 p.m.

I.E.S. (Edinburgh Centre).—"Lighting for Celebrations." C. J. King. Lighting and Cleansing Dept., High St. 7 p.m.

BRIT. INSTN. OF RADIO ENGRS. (N.E. Section).—"Survey of Television Development and its Problems." H. J. Barton Chapple. Neville Hall, Westgate Rd., Newcastle. 6 p.m.

I.E.E. (Mersey and N. Wales Centre).—"Some Aspects of Electric Propulsion." E. L. N. Towle. Temple, Dale St., Liverpool. 6 p.m.

BRIT. INSTN. OF RADIO ENGRS. (S. Midlands Section).—"Electronic Circuitry." G. J. Scoles. College of Technology and Arts, Rugby. 7 p.m.

I.E.E. (N. Midland Centre).—"Testing, Reconditioning and Servicing of Domestic Appliances." H. Hobbins. Y.E.B., Ferensway, Hull. 7.30 p.m.

I.E.E. (Sheffield Sub-Centre).—"Some Electro-magnetic Problems." Prof. G. W. O. Howe. Grand Hotel. 6.30 p.m.

I.E.E. (Scottish Centre).—"Design of Power Transformers to withstand Surges due to Lightning." A. T. Chadwick, J. M. Ferguson, D. H. Ryder, G. F. Stearn. Heriot-Watt College, Edinburgh. 7 p.m.

I.E.E. (Southern Centre).—"Magnetic Amplifiers." A. G. Milnes. R.A.E. College, Farnborough. 7.30 p.m.

ENGINEERS' GUILD (S. Wales and Mon. Branch). Inaugural meeting of Swansea Centre. Address by president, Robert Chalmers. Mackworth Hotel. 7 p.m.

I.E.E. (S. Midlands Students' Section). "Development of Electricity Supply." D. H. Kendon. Jas. Watt Memorial Inst., Gt. Charles St., Birmingham. 6.45 p.m.

A.S.E.E. (Birmingham Branch). "Modern Electro-Plating." A. F. Brockington. Chamber of Commerce, New St. 7 p.m.

A.S.E.E.(Bradford Branch). "Stage Lighting and Effects." J. H. Greenwood. Midland Hotel. 7.30 p.m.

A.S.E.E. (Coventry Branch). "Recent Developments in Motor Car Electrical Equipment." W. Cooke. Tech. College, The Butts. 7.15 p.m.

A.S.E.E. (Kent Branch). "Domestic Refrigeration." R. Sisley. Royal Star Hotel, Maidstone. 8 p.m.

THURSDAY, DEC. 14

DUNFERMLINE ELECT. SOC.—"Television." R. T. Frost, of Pye Ltd. Unitas Hall, Queen Anne St. 7 p.m.

I.E.S. (Gloucester and Cheltenham Centre).—"Sports Lighting." D. E. Beard. Cadena Cafe, Eastgate St., Gloucester. 6.30 p.m.

I.E.S. (Leicester Centre).—"Electronic Flash Tube." A. J. Meadowcroft. E. Midland Elect. Board, Charles St. 6.30 p.m.

I.E.S. (Manchester Centre).—Luncheon meeting at Midland Hotel.—12.30 p.m. Presidential address. L. J. Davies. Manchester Town Hall Extension. 6 p.m.

INCORP. PLANT ENGRS. (Kent Branch).—"Thermostatic Control." T. W. Palk. Maidstone Tech. College. 7 p.m.

I.E.E. (N.E. Scotland Sub-Centre).—Scottish Centre's chairman's address. J. Henderson. Royal Hotel, Union St., Dundee. 7 p.m.

I.E.E. (W. Wales Sub-Centre).—"The Phase/Neutral System of Supply for Rural H.V. Distribution." G. T. Garwood and G. J. Websdale. Plaza Cinema, Swansea. 6 p.m.

INST. OF WELDING (N. London Branch). "Welding of Heavy Machine Parts." C. E. Moore. Enfield Tech. College.

East meets West

Henley Telephone Cable seen here arriving at Calcutta is another reminder of our long association with India. The drum is part consignment of a contract for the Government of India valued at over £300,000.

BY APPOINTMENT
ELECTRIC CABLE
MANUFACTURERS

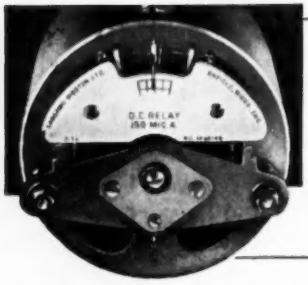
Let **HENLEY CABLES** *carry the current*

W.T. HENLEY'S TELEGRAPH WORKS CO. LTD. 51-53 HATTON GARDEN, LONDON. E.C.1

FEATURES OF WESTON SUPERIORITY

Weston
MOVING COIL RELAYS

This modern range of relays is ideal for all Laboratory or Industrial Purposes. Built on the permanent-magnet moving coil principle, unaffected by external magnetic fields, the precious metal contacts will not oxidise or tarnish, and the high torque developed ensures positive contact pressure. Supplied in Bakelite casing. Most applications call for special requirements and enquiries should therefore enclose a diagram of the circuit to be closed and state (a) High and/or low contact adjustment; (b) mounting position; (c) resistance; (d) values of current and voltage in local circuit and whether DC or AC; (e) values of resistance and any inductance or capacitance in local circuit; and (f) any special accuracy required. Every 'Weston' relay is specially designed to give the best possible performance for its individual purpose. (The Model illustrated is S54.)



ACCURACY OF ADJUSTMENT. Special note should be made of the reduction gearing which enables the *user* to make accurate adjustment with absolute ease. The accuracy and rigidity of the mounting ensures constant centring after adjustment. Yet another special 'Weston' feature.

SANGAMO WESTON LIMITED

ENFIELD, MIDDLESEX: Telephone: Enfield 3434 (6 lines) & 1242 (4 lines) Telegrams: Sanwest, Enfield.
BRANCHES: GLASGOW, MANCHESTER, NEWCASTLE-ON-TYNE, LEEDS, WOLVERHAMPTON, BRISTOL, SOUTHAMPTON, BRIGHTON LIVERPOOL AND NOTTINGHAM

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CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS | WANTED FOR SALE WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia St., W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 35s. per inch, and all other classified advertisements at 2s. 6d. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

HASLEMERE URBAN DISTRICT COUNCIL

CONVERSION OF PUMPS FROM DIESEL TO MOTOR DRIVEN

THE above Council invite tenders for the supply and installation of an electric motor of approximately 60 b.h.p. to drive a multi-stage centrifugal pump, together with starting and automatic control gear, at Sturt Road Water Pumping Station, Haslemere, Surrey.

Specification, conditions of contract and form of tender may be obtained from the Engineer and Surveyor to the Council at the address given below.

Sealed tenders, endorsed "Pump Conversion," to be received by me not later than noon on December 30, 1950.

The lowest or any tender will not necessarily be accepted.

V. L. MORGAN,
Clerk of the Council.

Council Offices, Museum Hill,
Haslemere, Surrey.
November 27, 1950. (G 811)

CITY AND COUNTY OF THE CITY OF CHESTER

TO ELECTRICAL WIRING CONTRACTORS

TENDERS are invited for the renewal of the electrical installation in the Town Hall, Chester.

Specifications, drawings and forms of tender may be obtained from and conditions of contract inspected at the office of the Consulting Engineers, Messrs. Sloan & Lloyd Barnes, 34 Castle Street, Liverpool 2 immediately.

No tender will be considered unless it is in a sealed envelope, endorsed "Tender—Town Hall Lighting," and addressed and delivered to the undersigned not later than 5 p.m. on Monday, January 1, 1951.

The Corporation does not bind itself to accept the lowest or any tender.

G. HURKINSHAW,
Town Clerk.

Town Hall, Chester.
December, 1950. (H 47)

COUNTY BOROUGH OF BELFAST

Electricity Department

STORES

TENDERS are invited for the supply of the undermentioned materials:—

Form No.
2. Transformer Oil.
5. Carbon Brushes.
10. 6,600-V Compound Filled Armourclad Switchgear.
12. Electricity Maximum Demand Indicators.
13. Automatic Time Switches.
15. Static Transformers.
16. Vulcanised Bitumen and Paper Insulated Cables and Joint Boxes.
21. Electric Cookers.
23. Street Lighting Fittings, Steel and Concrete Poles, and Ancillary Equipment.
25. Overhead Line Materials.
26. Mineral Insulated Copper Covered Cables and Terminating Accessories.
27. Electrical Accessories and Tinned Weak Back Ferrules.
29. Rubber Insulated Cables and Flexible Cords.
30. Lamps.
33. Nickel-Iron Switch Tripping Batteries and Charging Equipment.
34. 6,600-V Ring Main and Switch Fuse Units.

Note.—Forms Nos. 29 and 30 are in respect of materials which shall be supplied to any department of the Corporation.

Forms of tender and further particulars may be obtained at the Electricity Department, East Bridge Street, Belfast.

Each tender, in sealed envelope marked "Tenders for

(*Continued in next column*)

(*Continued from previous column*)

Stores, Electricity Department," and endorsed with the name and address of the tenderer, must reach the undersigned not later than 4 p.m. on Friday, January 5, 1951.

An official receipt must be obtained for each tender delivered by hand. Tenders sent by post should be registered.

The lowest or any tender will not necessarily be accepted.

JOHN DUNLOP,
Town Clerk.

City Hall, Belfast.
December 1, 1950. (H 48)

CITY OF WINCHESTER

Garnier Road Pumping Station

SUPPLY AND ERECTION OF DIESEL ENGINES AND ELECTRIC MOTOR

THE Corporation invites Tenders for the supply and erection of two Diesel Engines (each 100 h.p.) and a variable speed electric motor (100 h.p.) for driving three existing pump sets. Specifications and Forms of Tender, which will be issued separately for the two types of machinery, may be obtained from the City Engineer, Guildhall, Winchester.

Tenders endorsed "ENGINES (MOTOR), GARNIER ROAD" in plain sealed envelopes, must be delivered to the undersigned not later than Thursday, December 28, 1950.

R. H. McCALL,
Town Clerk.

The Guildhall,
Winchester. (G 795)

APPOINTMENTS VACANT

BRITISH ELECTRICITY AUTHORITY

Merseyside and North Wales Division

APPLICATIONS are invited for the following appointments in the Transmission Department at Divisional Headquarters, Woolton, Liverpool:—

(a) SECOND ASSISTANT ENGINEER (Maintenance).
(b) SECOND ASSISTANT ENGINEER (Construction).
(c) THIRD ASSISTANT ENGINEER (Construction).
(d) ELECTRICAL DRAUGHTSMAN.

Applicants for (a) and (b) should have had wide experience in the maintenance, construction and commissioning of 132 kV overhead lines, substations and associated equipment, and should possess an engineering degree or equivalent qualification. Corporate membership of the I.E.E. is desirable. Salary, Class "AX," Grade 2, £752, rising to £884 per annum.

Applicants for (c) should have had experience in the layout, erection and commissioning of 132 kV overhead lines, substations and associated equipment. Corporate or Graduate membership of the I.E.E., or equivalent qualifications, is desirable. Salary, Class "AX," Grade 5, £579, rising to £710 per annum.

Applicants for (d) should have had experience in the design and layout of 132 kV and 33 kV outdoor substations and associated equipment. Some experience in building and site work would be an advantage but is not essential. Salary will be within the range £375 to £450 per annum according to experience and qualifications, and is provisional pending negotiations between the Authority and the appropriate organisation.

All the above appointments are superannuable under the British Electricity Authority and Area Boards' Superannuation Scheme and subject to a medical examination.

Forms of application may be obtained from the Divisional Secretary, Clarke Gardens, Woolton, Liverpool, and should be returned not later than Tuesday, December 19, 1950.

A. R. COOPER,
Divisional Controller.
(H 54)

BRITISH ELECTRICITY AUTHORITY

North-Western Division

APPLICATIONS are invited for the position of GENERAL ASSISTANT ENGINEER in the Investigations Section of the Technical Department at Divisional Headquarters.

Candidates should at least hold the Higher National Certificate, and be conversant with general electrical measurements, and measuring devices. A working knowledge of electronics will be an advantage.

The successful candidate will be required to assist in the development of testing equipment and specialised testing, including high-voltage tests.

The salary for this position, which is superannuable, will be £457 to £622 per annum, in accordance with Grade 8, Class "AX/DX" of Schedule C of the Revised National Joint Board Agreement.

Applications, stating age, present position, qualifications, and giving full details of education and experience, should be received by the Establishment Officer, British Electricity House, Wilmslow Road, East Didsbury, Manchester 20, not later than December 18, 1950. (H 61)

EASTERN ELECTRICITY BOARD

Suffolk Sub-Area

SECOND ASSISTANT ENGINEER—STOWMARKET DISTRICT

APPLICATIONS are invited for the appointment of a Second Assistant Engineer in the Stowmarket District of the Suffolk Sub-Area.

Candidates should have had a sound technical training and experience in the construction, operation and maintenance of h.v. and l.v. overhead and underground systems with substations in a predominantly rural area.

The salary for the appointment will be in accordance with Class "D," Grade 7, of the N.J.B. Schedule, commencing at £563 per annum. Both the salary and conditions of service will be subject to agreements made from time to time by the appropriate negotiating bodies.

The successful candidate will be required to contribute to a superannuation scheme, and may be required to undergo a medical examination.

Applications, stating age, education, technical qualifications and experience, with details of present appointment, should be addressed to the District Manager, Stowmarket, Eastern Electricity Board, 25 Ipswich Road, Stowmarket, Suffolk, so as to reach him within 14 days of the appearance of this advertisement. (H 62)

COUNTY BOROUGH OF ROTHERHAM

Education Committee

ROTHERHAM TECHNICAL COLLEGE

Principal: C. L. Old, B.Sc.(Eng.), M.Sc.Tech., M.I.Mech.E.

REQUIRED as soon as possible, a Graduate LECTURER in Electrical Engineering or Physics for duties in the Department of Electrical Engineering and Physics. The work of the department ranges from pre-senior courses to those for London external degrees.

Salary will be in accordance with the Burnham Technical Scale for Teachers, due allowance being made for previous experience in fixing the commencing salary.

Application forms may be obtained from the undersigned, to whom they should be returned as soon as possible.

R. BLOOMER,
Director of Education.

Education Offices,
Rotherham. (H 18)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

BOILER HOUSE SHIFT CHARGE ENGINEER—NORTH WILFORD

APPLICATIONS are invited for the position of Boiler House Shift Charge Engineer, North Wilford Generating Station, Nottingham.

Applicants should have had a sound technical training, a good general engineering experience and a knowledge of the control and operation of large pulverised fuel boilers and associated equipment. Preference will be given to candidates who are in possession of technical qualifications admitting to Corporate Membership of a recognised professional institution.

The salary will be in accordance with Class "K," Grade 9 of the National Joint Board Schedule and the post will be superannuable within the provisions of the B.E.A. and Area Boards' Superannuation Scheme.

Applications should be submitted on the official form, which may be obtained from the Divisional Establishments Officer at the undermentioned address, and returned to him not later than December 26, 1950.

W. S. BURGE,
Divisional Controller.

British Electricity House,
Barker Gate,
Nottingham. (H 21)

BRITISH ELECTRICITY AUTHORITY

South-Western Division

SECOND ASSISTANT ENGINEER—TRANSMISSION DEPARTMENT
DIVISIONAL HEADQUARTERS

APPLICATIONS are invited for the appointment of Second Assistant Engineer in the Transmission Department at Divisional Headquarters, Bristol.

Candidates should be corporate members of the Institution of Electrical Engineers or hold equivalent qualifications and should have specialist experience in the construction and maintenance of high-voltage transmission lines.

Salary and conditions of service will be in accordance with the National Joint Board Agreement, Grade 2, Class "AX/CX," £752 to £884/£920 to £938 per annum.

The appointment will be superannuable in accordance with the British Electricity Authority and Area Boards' Superannuation Scheme.

Applications, stating age, qualifications, experience, present appointment and salary, should be addressed to the Divisional Secretary, British Electricity Authority, South Western Division, British Electricity House, 26 Oakfield Road, Bristol 8, so as to be received not later than December 22, 1950.

R. C. BARRETT,
Divisional Secretary.

December 1, 1950. (H 53)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

METER REPAIRER (MECHANICIAN)

APPLICATIONS are invited for employment as a Meter Repairer (Mechanician) in the Northwich District of the Board's No. 2 Sub-Area.

The duties will include repairs to indicating and recording instruments, and applicants should be experienced in instrument repair and micro-lathe work.

The position is subject to the conditions of the National Joint Industrial Council for the Electricity Supply Industry, and the present rate of pay is 35.00d. per hour, based on a 44-hour, 5-day week.

Applications, endorsed "Meter Repairer (Mechanician)," and stating age, experience, qualifications and present employment, should be sent to the Manager, No. 2 Sub-Area, Merseyside and North Wales Electricity Board, Sandiway House, nr. Northwich, Cheshire, so as to be received not later than first post on December 13, 1950.

JAMES RANKIN,
Secretary.
(H 63)

MIDLANDS ELECTRICITY BOARD

North Staffordshire Sub-Area

APPOINTMENT OF ARCHITECTURAL DRAUGHTSMAN

APPLICATIONS are invited for the above position at the Sub-Area Headquarters, 31 Kingsway, Stoke-on-Trent.

Applicants should have received a recognised architectural training and should be conversant with design and construction of industrial and commercial type building.

The commencing salary within the range of £425-£475 per annum according to qualifications and experience will be provisional, and subject to negotiation with such organisation as may be appropriate.

Applications, giving full details of age, experience and qualifications, should be forwarded within fourteen days to: Mr. H. A. P. Caddell, Sub-Area Manager, Midlands Electricity Board, 31 Kingsway, Stoke-on-Trent.

A. STEPHENS,
Secretary.

November 29, 1950. (H 57)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

SHIFT CHARGE ENGINEER, CHESTERFIELD

APPLICATIONS are invited for the position of Shift Charge Engineer at Chesterfield Generating Station.

Applicants should have a sound technical training and practical experience in the operation and control of steam generating plant and switchgear, and preference will be given to candidates who have a Higher National Certificate or equivalent qualifications.

The salary will be in accordance with Class "B," Grade 7 of the N.J.B. Schedule and the post will be superannuable within the provisions of the British Electricity Authority and Area Boards' Superannuation Scheme.

Applications should be submitted on the official form, which can be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and should be returned not later than December 26, 1950

W. S. BURGE,
Divisional Controller.
(H 20)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following appointment in the Technical (Electrical) Department at Divisional Sub-Headquarters, West Farm Place, Cockfosters:—

GENERAL ASSISTANT ENGINEER (Metering Section)

The duties of the post will be assisting with metering and general technical work.

Applicants should be Graduate or Corporate Members of the Institution of Electrical Engineers, and have had experience in metering and/or protective gear equipment, in addition to an engineering works training.

Salary range in accordance with the Revised N.J.B. Agreement, Schedule "C," Grade 8, Class "AX/CX" £437-£604 per annum (plus London Weighting).

The commencing salary will depend upon qualifications and experience.

The appointment will be superannuable in accordance with the British Electricity Authority and Area Boards' Superannuation Scheme.

Forms of application may be obtained from the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, to whom completed forms should be sent to arrive not later than December 15, 1950. Envelopes should be endorsed "General Assistant Engineer (Metering Section)."

W. N. C. CLINCH,
Controller.

Northmet House,
Southgate, N.14. (G 809)

SOUTHERN ELECTRICITY BOARD

No. 3 (Portsmouth) Sub-Area

PORTSMOUTH DISTRICT

APPLICATIONS are invited for the post of OPERATION AND MAINTENANCE ENGINEER (First Assistant).

Qualifications: Candidates must have had wide experience in the operation and maintenance of distribution systems and substations at pressures up to 33 kV, together with experience in the control of staff and labour. They must possess recognised technical qualifications and preferably be Corporate Members of the I.E.E.

Salary and conditions of service: Salary in accordance with N.J.B., Class "F," Grade 5 (£711-£724-£737) with N.J.B. Conditions of Service. The successful candidate will be required to contribute to the B.E.A. and Area Boards' Superannuation Scheme, if eligible.

Applications: On a standard form, obtainable from the Sub-Area Secretary, Lower Drayton Lane, Cosham, Portsmouth, and returned to him not later than ten days after the appearance of this notice.

F. W. KEMPTON,
Secretary.
(H 42)

KENT COUNTY COUNCIL

APPLICATIONS are invited for the appointment in the Buildings Department of an ENGINEERING ASSISTANT (Electrical), at a salary in A.P.T., Grade V (£520-£570).

The post is superannuable and the successful candidate will be required to pass a medical examination.

Applicants must be Graduate Members of the Institution of Electrical Engineers with at least five years' experience in the preparation of schemes, specifications and estimates for all classes of electrical installation work.

Applications, on forms obtainable from the County Architect, Springfield, Maidstone, must be delivered to him not later than fourteen days after the appearance of this advertisement.

W. L. PLATTS,
Clerk of the County Council.

County Hall, Maidstone.
December 1, 1950. (H 55)

CITY OF SALISBURY, SOUTHERN RHODESIA

Electricity Department

VACANCY—CHIEF DISTRIBUTION ENGINEER
GRADE £1,108 16/- x £43 4/—£1,281 12/-

APPLICATIONS are invited, and will be received by the undersigned on or before January 1, 1951, for the post of Chief Distribution Engineer on the grade set out above which, with the present cost of living allowance, amounts to £1,207-£1,371, plus children's allowances of £30 per annum for the first child and £24 per annum for each subsequent child. Income tax is such that a married man with two children pays practically no income tax on this salary. A three-bedroomed house at £14 per month is provided.

Those interested, being in possession of a degree in Electrical Engineering and Corporate Membership of the Institution of Electrical Engineers, should write to the undersigned for further details. Davis and Soper Ltd., Agents to the City Council of Salisbury, 52 and 54 St. Mary Axe, London E.C.3.

November 29, 1950. (H 41)

BRITISH ELECTRICITY AUTHORITY

REVENUE PURCHASING DEPARTMENT, HEADQUARTERS, LONDON

APPLICATIONS are invited for the following posts in the Revenue Purchasing Department at the Winsley Street offices of the Authority's Headquarters in London.

(1) PRINCIPAL ASSISTANT (TRANSPORT). Candidates should be fully conversant with rail, road and canal rates and charges, also railway demurrage, standage and siding agreements. Knowledge of the qualities of coal as supplied to the Electricity Industry would be an advantage.

Salary will be within Grade 8 of the National Joint Council Salary Agreement, i.e., £835 rising by annual increments of £35 to £940 per annum, inclusive of London Allowance.

(2) SENIOR CLERICAL ASSISTANT. Candidates should have a good general knowledge of the qualities of coals produced in the various coal fields and the present system of allocating supplies. Practical experience in the marketing branch of the coal trade would be an advantage.

Salary will be within Grade 4 of the National Joint Council Salary Agreement, i.e., £540, rising by annual increments of £20 to £600 per annum, inclusive of London Allowance.

Both the above posts are superannuable.

Applications, stating age, present salary, and giving full details of qualifications and experience, should be forwarded to D. Moffat, Director of Establishments, British Electricity Authority, British Electricity House, Great Portland Street, London W.1 so as to be received not later than December 28, 1950. (H 23)

CROWN AGENTS FOR THE COLONIES

ELECTRICAL ENGINEER (Hydro-Electric) required by the Central Electricity Board, Federation of Malaya, for three years, with prospect of permanency. Salary (including expatriation pay) payable in local currency, equivalent at the present Government rate of exchange to £742 a year, rising to £1,652 a year. Commencing salary according to age and experience. Cost-of-living allowance equivalent to between £210 and £525 a year, according to salary and dependants. Free passages. Liberal leave on full salary. Candidates, between 24 and 35 years of age, must be corporate members or graduates of the Institution of Electrical Engineers (or the equivalent), and have had sound training in both electrical and mechanical engineering, with experience in the operation of medium electricity supply undertakings. They should possess a competent knowledge of the erection and maintenance of high- and low-tension overhead and underground a.c. distribution systems and sub-station plant. Experience in maintenance and operation of diesel engines a distinct advantage. Preference will be given to candidates with experience of hydro-electrical construction.

Apply at once by letter, stating age, full names in block letters, and full particulars of qualifications and experience, and mentioning this paper, to the Crown Agents for the Colonies, 4 Millbank, London S.W.1, quoting M25728B on both letter and envelope. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. (H 74)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the position of SHIFT CHARGE ENGINEER at Earley Generating Station, Grade G7 (£651-£679).

Applicants should preferably be in possession of technical qualifications, admitting to corporate membership of a recognised professional institution, have had previous experience in a large modern generating station, and preferably have had experience of a modern station with high temperatures and pressures, and pulverised fuel equipment. Manufacturing works experience will be an advantage.

Application forms may be obtained from the undersigned, and must be returned by December 21, 1950.

P. D. A. OLIVER,
Divisional Secretary.

British Electricity House,
111 High Street, Portsmouth. (H 56)

EAST MIDLANDS ELECTRICITY BOARD

Lincolnshire Sub-Area

APPLICATIONS are invited for the appointment of DEMONSTRATOR in the Grantham District of the Lincolnshire Sub-Area. Applicants must have Domestic Science Training, including Electrical Housecraft, be competent to give cookery demonstrations, advice to consumers on the utilisation of electrical appliances and lectures and should possess an approved certificate.

The salary will be in accordance with the N.J.C. Agreement, Grade 1 (£310-£390), the commencing salary being dependent upon qualifications and experience.

Applications, giving age, particulars of training, qualifications and experience, should be submitted to the Manager, Grantham District, 21 High Street, Grantham, not later than January 1, 1951.

P. H. DE KEYSER,
Secretary.
(H 76)

NORTH WESTERN ELECTRICITY BOARD

No. 5 Sub-Area

APPOINTMENT OF DISTRICT ENGINEERING STAFF

APPLICATIONS are invited for the following appointments in the No. 5 Sub-Area at the provisional salaries shown:

Blackburn District.

(a) SECOND ASSISTANT DISTRICT ENGINEER. N.J.B. Schedule, Class "F," Grade 7, £625-£634-£643 per annum.

(b) THIRD ASSISTANT DISTRICT ENGINEER. N.J.B. Schedule, Class "F," Grade 9, £538-£549-£560 per annum.

Burnley District.

(c) THIRD ASSISTANT DISTRICT ENGINEER. N.J.B. Schedule, Class "F," Grade 9, £538-£549-£560 per annum.

Clitheroe District.

(d) SECOND ASSISTANT DISTRICT ENGINEER. N.J.B. Schedule, Class "D," Grade 7, £563-£568-£573 per annum.

The duties of the posts will be to assist in the operation, maintenance and construction of underground and overhead mains, substations and transformers and general mains duties, and to undertake standby duties.

Preference will be given to candidates who are Corporate or Graduate Members of the Institution of Electrical Engineers, or who possess the Higher National Certificate in Electrical Engineering.

Applications, stating age, qualifications and experience, present position and salary, should be received by R. H. Harral, M.I.E.E., M.Inst.F., Sub-Area Manager, No. 5 Sub-Area, The North Western Electricity Board, Jubilee Street, Blackburn, not later than Saturday, December 16, 1950. (H 39)

YORKSHIRE ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:

No. 1 (Bradford) Sub-Area

CONSUMERS' ENGINEER (SKIPTON DISTRICT).

(Vacancy No. 75/50).

Applicants should have a good general and technical education, with considerable experience in the commercial and engineering aspects of a district organisation, including negotiations with all classes of consumers. They must be capable of preparing and supervising schemes for all types of estimates and tenders. Possession of Higher National Certificate or its equivalent will be an advantage.

Salary, N.J.B., Class "D," Grade 8, £524 to £542 per annum.

Applications, stating the above vacancy number, and giving full details of age, qualifications, and experience, should be forwarded to the Manager, No. 1 (Bradford) Sub-Area, Yorkshire Electricity Board, 45-53 Sunbridge Road, Bradford, within 14 days of the appearance of this advertisement.

No. 7 (Grimsby) Sub-Area

FOREMAN OVERHEAD LINESMAN, GRIMSBY
CHARGEHAND OVERHEAD LINESMAN, BRIGG

(Vacancy No. 91/50).

Applications are invited for the above positions from persons fully experienced in, and capable of supervising, the erection and maintenance of HV overhead lines.

The rates of pay and conditions of service will be in accordance with the National Joint Industrial Council Schedule for the Electricity Supply Industry, the present rate of pay for a 44-hour, 5-day week being:

Foreman Overhead Linesman 3s. 2d. per hour.
Chargehand Overhead Linesman 3s. per hour.

Applications, stating the above vacancy number, and giving full details of age, qualifications, and experience, should be forwarded to the Manager, No. 7 (Grimsby) Sub-Area, Yorkshire Electricity Board, Moss Road, Grimsby, within 14 days of the appearance of this advertisement. (H 60)

EAST MIDLANDS ELECTRICITY BOARD

Lincoln District

APPLICATIONS are invited for the post of METER TESTER in the Lincoln District. Candidates should have a sound technical and practical training in the calibration of all types of meters and instruments, single-phase and three-phase.

Wages and conditions are as set out in the National Joint Industrial Council Agreement, at present 35d. per hour for a 44-hour week.

Applications, stating age, training and experience, should be addressed to The District Manager, The East Midlands Electricity Board, Lincoln District, Bravford Side North, Lincoln, so as to arrive not later than January 1, 1951.

P. H. DE KEYSER,
Secretary.
(H 75)

NORTH WESTERN ELECTRICITY BOARD

No. 7 Sub-Area

Sub-Area Consumers' Engineer's Department

APPOINTMENT OF SECOND ASSISTANT DISTRICT COMMERCIAL ENGINEER—7D DISTRICT (MACCLESFIELD)

APPLICATIONS are invited for the appointment of Second Assistant District Commercial Engineer in the Macclesfield District of the No. 7 Sub-Area.

The duties will be to assist generally in all activities connected with the utilisation of electricity for domestic, commercial, agricultural and industrial purposes.

Applicants should have had a wide experience in the preparation of specifications and estimates, and the supervision of all types of installations, including public lighting, the supervision of the maintenance and repair of apparatus, control of service centres, exhibitions and demonstrations, consumers' record systems and the supervision of staff.

Corporate membership of the Institute of Electrical Engineers will be an advantage.

The salary will be in accordance with the National Joint Board Revised Schedule, Class "D," Grade 7, i.e. £563-£568-£573 per annum.

Applications, stating age, qualifications and experience, present position and salary, should be received by J. Harwood Lumsden, M.I.Mech.E., A.M.I.E.E., Sub-Area Manager, No. 7 Sub-Area, The North Western Electricity Board, Electricity Offices, Chapel Street, Hazel Grove, Cheshire, not later than Saturday, December 16, 1950. (H 40)

BRITISH ELECTRICITY AUTHORITY

Yorkshire Division

SKELTON GRANGE POWER STATION, LEEDS

APPLICATIONS are invited from qualified engineers for the following shift operating staff at the above power station.

The station will have an ultimate capacity of 360 MW and will be equipped with 60-MW turbo-alternators and 360 and 550 klb/hr pulverised fuel-fired boilers.

Conditions of service and salary will be in accordance with the National Joint Board Agreement.

(a) SHIFT CHARGE ENGINEERS, Class "G," Grade 7. Commencing salary, £651 per annum.

(b) STATION SHIFT CONTROL ENGINEERS, Class "G," Grade 10. Commencing salary, £539 per annum.

(c) JUNIOR ENGINEERS, Class "G," Grade 16. Commencing salary, £375 per annum.

Applicants for positions (a) and (b) must have had a sound technical training, and be fully experienced in a similar position for which application is made.

Preference will be given to candidates who are corporate or graduate members of the Institution of Electrical Engineers and/or the Institution of Mechanical Engineers, or hold equivalent qualifications.

Forms of application may be obtained from the Divisional Secretary, British Electricity Authority, Yorkshire Division, British Electricity House, St. Mary's Road, Leeds, to whom completed forms should be returned within 14 days of the appearance of this advertisement. Envelopes to be endorsed with the title of the position applied for.

G. A. VOWLES,
Divisional Controller.
(G 58)

HIS MAJESTY'S COLONIAL SERVICE

MALAYA

A VACANCY exists for an ENGINEER in the Department of Broadcasting, Malaya, to install and manage broadcasting studios, recording channels, and transmitters on a salary scale of $460 to $1,065 per month (equivalent to £641—£1,491 per annum). In addition a cost of living allowance is payable, and varies from £210 per annum for a single officer to a maximum of £525 for a married officer with children. Income tax is at a low rate.

The appointment is permanent and pensionable but subject to a probationary period of 3 years. Free passages are provided for the officer, his wife and up to 3 children on appointment; and for the officer and his wife in respect of each tour, while assistance is given towards children's passages. Furnished quarters are provided if available, at rates varying from $20.5 to $71 per month (equivalent to just under £29—£100 per annum.) Vacation leave will be granted at the rate of 4 days per month of resident service in a tour of 3-4 years. Free medical attention.

Candidates, between the ages of 23 and 35, should have an Engineering Degree, Graduateship of the Institute of Electrical Engineers or equivalent, and at least 2 years' general experience with an organisation handling studio and transmitter equipment. The successful candidate will later be required to pass an examination in Malay.

Candidates should write for an application form, stating age, experience and qualifications, to the Director of Recruitment (Colonial Service), Colonial Office, Sanctuary Buildings, Great Smith Street, London S.W.1, quoting reference No. 27326/39. (H 7)

BRITISH ELECTRICITY AUTHORITY

Yorkshire Division

POWER STATION CHEMIST AND ASSISTANT CHEMIST—SKELTON GRANGE POWER STATION

APPLICATIONS are invited from suitably qualified chemists for the following positions at Skelton Grange Power Station, Leeds.

The power station will have an ultimate capacity of 360 MW and will be equipped with pulverised fuel-fired boilers operating at 900 p.s.i.

Station Chemist

Preference will be given to applicants holding A.R.I.C. or its equivalent, but consideration will be given to those holding Higher National Certificate in Chemistry and who are pursuing a recognised course of study with a view to final qualification.

Applicants should have had previous power station experience, preferably with pulverised fuel-fired, high pressure boilers. Experience of problems associated with corrosion, condenser and external boiler fouling will be considered advantageous.

Conditions of service and salary will be in accordance with the National Joint Board Agreement, Grade 8, Class "G" (£607-£631 per annum).

Assistant Chemist

Applicants for the position of an Assistant Chemist should hold the Higher National Certificate in Chemistry or its equivalent.

Good general analytical experience is required with reference to fuel, flue gas, water and oil.

Conditions of service and salary will be in accordance with the National Joint Board Agreement, Grade 13, Class "G" (£433-£449 per annum).

The grades and salaries for the above positions are provisional and subject to determination by the National Joint Board.

The appointments will be subject to the provisions of the Authority's Superannuation Scheme.

Applications should be made on forms obtainable from the Divisional Secretary, British Electricity Authority, Yorkshire Division, British Electricity House, St. Mary's Road, Leeds 7, to whom completed forms should be returned within fourteen days of the appearance of this advertisement. Envelopes to be endorsed "Station Chemist" or "Assistant Chemist."

G. A. VOWLES,
Divisional Controller.
(H 43)

CITY OF SALISBURY (SOUTHERN RHODESIA)

Electricity Department

VACANCY FOR SWITCHBOARD ATTENDANTS
SALARY GRADE £583 4s. BY £36 TO £691 4s.

APPLICANTS should have completed a technical education to the standard of graduate of the Institution of Electrical Engineers and must have had experience in the operation of Power Station plant including control room duties (preferably on an interconnection system) and the running up of steam turbine plant.

The appointment is subject to Council's Service and leave regulations, which will be made available for inspection by selected candidates at the office of the undersigned. The salary payable will be in accordance with the above salary grade, plus a cost-of-living allowance at present fixed at approximately 10 per cent. of the basic salary and children's allowances where applicable.

The successful candidate must be able to comply with the regulations of the Southern Rhodesia Immigration Authorities and will be required to submit a satisfactory medical certificate of fitness.

Applicants, who should be not more than 35 years of age, are requested to submit full particulars of their qualifications, training and experience, giving details of positions held and salaries received, marital state, age, place of birth and nationality. Copies of not more than three recent testimonials may be included.

Canvassing, directly or indirectly, will be a disqualification.

Applications, suitably endorsed on the cover, must reach the office of the undersigned on or before the 22nd December, 1950. Airmail paper should be used.

DAVIS & SOPER, LTD.,
Agents to the City Council of Salisbury,
52 and 54 St. Mary Axe, London, E.C.3.
November 20, 1950. (G 773)

BRITISH ELECTRICITY AUTHORITY

STATION SHIFT CONTROL ENGINEER at Tunbridge Wells Power Station. Experience in control-room duties essential; Higher National Certificate preferable. N.J.B. conditions of service and salary, Class "C", Grade X, £438 p.a., will be provisional and without prejudice to future national agreement on whether this position shall be covered by the N.J.B. or N.J.I.C. agreements.

Application forms, obtainable from Divisional Secretary, B.E.A., S.E. Division, Lower Ham Road, Kingston-upon-Thames, to be returned by December 20, 1950. (H 8)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

ASSISTANT CHARGE ENGINEER—BURTON-ON-TRENT

APPLICATIONS are invited for the position of Assistant Charge Engineer at Burton-on-Trent Generating Station.

Applicants should have sound technical qualifications and experience in the operation and maintenance of modern power stations.

The salary will be in accordance with Class "E," Grade 9 and the appointment will be superannuable under the provisions of the British Electricity Authority and Area Boards' Superannuation Scheme.

Applications should be submitted on the official form, which may be obtained from the Divisional Establishments Officer, British Electricity Authority, British Electricity House, Barker Gate, Nottingham, not later than December 26, 1950.

W. S. BURGE,
Divisional Controller.

British Electricity House,
Barker Gate,
Nottingham. (H 22)

NORTH EASTERN ELECTRICITY BOARD

APPLICATIONS are invited for a THIRD ASSISTANT ENGINEER in the Industrial Section of the Chief Commercial Officer's Department located at Middlesbrough, Yorkshire.

Applicants should have had practical training and general electrical engineering experience in the utilisation of electricity in industry.

Preference will be given to applicants who possess a degree in engineering of a British University and/or Corporate Membership of the Institution of Electrical Engineers. Salary offered is in accordance with Schedule C of the N.J.B. Salary agreement viz. Class "AX" Grade 5, £579-710 per annum, at a point in that Scale commensurate with qualifications and experience. The successful applicant will be required to join the appropriate superannuation scheme.

Applications, stating age, present position and salary, qualifications and experience, and whether married or single, should be addressed within 10 days of the appearance of this notice to the Secretary (Establishments Section), The North Eastern Electricity Board, Carliol House, Newcastle-upon-Tyne 1. (H 19)

SOUTH WESTERN ELECTRICITY BOARD

APPLICATIONS are invited from suitably qualified and experienced persons for the following positions on the engineering staff of the Board:

I. Bristol Sub-Area (Offices at Bristol)

(a) SECOND ASSISTANT ENGINEER (Construction). Commencing salary, £736 per annum (Class "J," Grade 7, N.J.B. Schedule).

The duties attached to this post include responsibility for all types of construction work, including u/g cables and o/h lines, switchgear and buildings; phasing of work and supply of materials; preparing specifications, reports and statistics; and maintaining progress records. Candidates should have had wide experience in these duties and be able to exercise supervision.

(b) SECOND ASSISTANT ENGINEER (Planning). Commencing salary, £736 per annum (Class "J," Grade 7, N.J.B. Schedule).

The successful candidate will be required to assist in the planning and initiation of all new works and extensions, the design of o/h lines, and preparation of capital sanction applications, specifications, reports, and statistics.

N.B.—These vacancies were advertised previously at lower grading, i.e., Third Assistant Engineers with salaries within Class "J," Grade 10, of the N.J.B. Schedule. Persons who applied at that time need not re-apply, as their original applications will be reconsidered.

II. Devon Sub-Area—Torbay District (Offices at Torquay)

SECOND ASSISTANT DISTRICT ENGINEER. Commencing salary, £579 per annum (Class "E," Grade 7, N.J.B. Schedule).

The successful candidate will be required to assist in the construction of o/h lines and sub-stations, and supervise the laying and jointing of HV and MV cables up to 33 kV. A knowledge of building construction is desirable.

The persons appointed to these posts will be required to undertake standby duty, if necessary. Possession of suitable technical qualifications will be an advantage.

Applications, stating age, present position and salary, qualifications and experience, and indicating for which post(s) candidates wish to be considered, should reach, in respects of posts I (a) and (b), the Sub-Area Manager, Bristol, South Western Electricity Board, Electricity House, Colston Avenue, Bristol, and for post II, the District Manager, Torbay, South Western Electricity Board, Union Street, Torquay, within 10 days. (H 59)

BRITISH ELECTRICITY AUTHORITY

Chief Engineer's Department, London

SENIOR DRAUGHTSMEN
DRAUGHTSMAN
FEMALE TRACER

APPLICATIONS are invited for the following vacancies in the Drawing office at Headquarters in London.

Senior Draughtsmen.—Candidates should be experienced in power-station layout or layout of 132 kV sub-stations.

The starting salaries will be determined according to age and experience, within the following provisional ranges: Grade "B," £600 to £750 p.a., or Grade "A" £500 to £650 p.a., including London allowance in each case.

Draughtsman.—Candidates should be experienced in reinforced concrete str uctures and light concrete foundations.

The starting salary will be in accordance with the scale £312 p.a. at age 21, rising to £468 p.a. at 25 and to an ultimate maximum of £500, including London allowance in each case.

Female Tracer.—Candidates should preferably have experience of power-station layout or civil engineering work.

The starting salary will be within the General Clerical Grade of the National Joint Council, ranging from £212 p.a. at age 21, rising by annual increments to £278 p.a. at 26 and to an ultimate maximum of £338 p.a., including London allowance in each case.

All the appointments are superannuable.

Application forms may be obtained from the Secretary's Office (Establishments), Application Section, British Electricity Authority, British Electricity House, Great Portland Street, London W.1, and should be completed and returned to D. Moffat, Director of Establishments, not later than December 22, 1950.

Please quote Reference AE/119. (H 64)

NORTH EASTERN GAS BOARD

Bradford Group

ADMINISTRATIVE ASSISTANT

APPLICATIONS are invited for an Administrative Assistant in the Group Office, at Bradford, at a salary within Grade VIII (£490 to £570 per annum) of the salary scales of the National Joint Council for Gas Staffs.

Candidates should be competent to deal with administrative and establishment matters.

The appointment will be subject (i) to such superannuation scheme as the Board may adopt and (ii) to the successful applicant passing a medical examination.

Applications, stating age, qualifications and experience, together with the names of two referees, should be sent to the Group General Manager, North Eastern Gas Board, Bradford Group, Britannia House, Bradford, so as to arrive not later than Monday, December 18, 1950.

J. C. GARDNER,
Secretary.

Bridge Street, Leeds, 2.
November 28, 1950. (H 26)

NORTH WESTERN ELECTRICITY BOARD

No. 7 Sub-Area

APPOINTMENT OF ELECTRICIANS AT MACCLESFIELD

APPLICATIONS are invited for the appointment of Electricians in "D" (Macclesfield) District at Mill Street, Macclesfield.

Experience on industrial, commercial and domestic installations will be an advantage.

The rate of pay and conditions of service will be in accordance with the National Joint Industrial Council Agreement for the Electricity Supply Industry, the present rate of pay being 35d. per hour (£6 8s. 4d.) for a 44-hour 5-day week.

Applications, stating age, experience, present post and wage, should be received by J. Harwood Lumsden, M.I.Mech.E., A.M.I.E.E., Manager, No. 7 Sub-Area, The North Western Electricity Board, Electricity Offices, Chapel Street, Hazel Grove, Cheshire, not later than December 23, 1950. (H 9)

BRITISH ELECTRICITY AUTHORITY

North Western Division

APPLICATIONS are invited for the position of Station SHIFT CONTROL ENGINEER at the Agecroft (L.P.) Generating Station, Agecroft Road, Pendlebury, Lancs.

The salary for this position, which is superannuable, will be in accordance with Grade 10, Class "F" of the Revised National Joint Board Agreement, i.e., £510-£530 per annum. Candidates should preferably possess technical qualifications and previous experience in a generating station is desirable.

Applications, stating age, qualifications, and giving full details of education and experience, should be received by The Establishment Officer, British Electricity House, Wilmslow Road, East Didsbury, Manchester 20, not later than December 16, 1950. (H 78)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

BRITISH ELECTRICITY AUTHORITY

North Western Division

APPLICATIONS are invited for the position of SHIFT CHARGE ENGINEER at Kearsley Generating Station, Stoneclough, near Manchester. The salary for the post, which is superannuable, will be £786 per annum, in accordance with Grade 7, Class "K" of the revised N.J.B. Schedule. Candidates should preferably have had experience in a large modern generating station, and possession of technical qualifications is desirable.

Applications, giving details of education, training, experience and present position, should be received by The Establishment Officer, British Electricity House, Wilmslow Road, East Didsbury, Manchester 20, not later than December 18, 1950. (H 77)

A FEW attractive vacancies for DRAUGHTSMEN exist at the Liverpool works of the English Electric Co. Ltd. The work is of electro mechanical nature, but any draughtsmen with experience on the design and detailing of mechanisms or welded fabrications or, in fact, any kind of medium mechanical equipment, will be considered. Excellent opportunities for advancement in this interesting field.—Please write, giving full details, mentioning reference 135A, to Central Personnel Services, English Electric Co. Ltd., 24/30 Gillingham Street, Westminster, S.W.1. (G 793)

ABERDARE CABLES LTD., Aberdare, require two ESTIMATORS competent to handle home and export inquiries for Paper Insulated Cables.—State age, experience, and salary required. Pension scheme. (H 27)

APPLICATIONS are invited for the post as SHIFT CHARGE ENGINEER at the Trading Estate Power Station, Slough. Candidates should possess good technical qualifications and be familiar with Power Station operation routine, and experienced with h.p. and l.p. boilers, turbo-alternators and ancillary equipment e.h.t. and l.t. switchgear. Commencing salary £575 per annum. A contributory pension scheme in operation.—Applications giving particulars of training, subsequent experience, together with copies of recent testimonials, to be addressed to the Chief Engineer, Slough Estates Ltd., Trading Estate, Slough. (H 51)

ARMATURE WINDER-FITTER required for motor repair work, South London area. Good rates.—Max Electric Co. Ltd., 190 Thornton Road, Croydon, Surrey. Tel.: Tno. 4276 (H 67)

BOILER ATTENDANTS. City of Salisbury (S. Rhodesia) Electricity Department. Vacancies for Boiler Attendants with experience in operation of high pressure power station boiler plant with chain grate stokers. Applicants must be prepared to pay cost of passage.—Particulars from Secretary, 1820 Memorial Settlers' Association, Grand Buildings, Trafalgar Square, London W.C.2. (H 49)

CABLE TESTING ENGINEER, London area. For Rubber and Paper Cables up to 33 kV.—Apply, stating age, experience, and salary required to Box No. 1977, Electrical Times. (H 16)

URGENTLY REQUIRED

POWER STATION CHARGE ENGINEERS

by major oil company for service in the Middle East. Applicants must hold at least Higher National Certificate in Electrical Engineering and have had not less than three years' experience in the operation of large modern Steam Power Stations with thorough knowledge of the routine operation of water-tube boilers, turbo-alternators, E.H.T. switchgear and auxiliary plant. Present position in this country should be not less than Grade 8a, Class "H" or Grade 8, Class "G" on N.J.B. Scale. Age not over 35 years. Married accommodation available. Commencing salary not less than £900 per annum PLUS an allowance in the local currency which is liable to variation but which at the present time is equal to £1,400 per annum. Free passages out and home, free medical attention, kit allowance, good leave arrangements, excellent Pension Scheme. Write, giving age, personal particulars, and full details of qualifications and experience, quoting Dept. F.189, to

Box No. 2550 at 191 Gresham House, E.C.2

(E 284p)

THE BRITISH IRON AND STEEL RESEARCH ASSOCIATION
11 PARK LANE, LONDON W.1

ASSISTANT ELECTRICAL ENGINEER required by the above Association to carry out applied research in the iron and steel industry. Honours degree in electrical engineering essential. Experience in light electrical engineering and in designing and building electronic equipment very desirable. Age range 23 to 27. Salary according to age, qualifications and experience, within the range of £450-£575 p.a. Post is superannuated under the F.S.S.U. Location of work London. Applications only to Personnel Officer, B.I.S.R.A.

DESIGNERS for Distribution Transformers (up to 1,000 kVA) required by large manufacturers on Merseyside. Applicants must have Higher National Certificate in Electrical Engineering and previous experience of this class of work is desirable. Applications with full details of age, education and present position may be sent in confidence.—Applications should be clearly marked "Transformer Designers," Box No. 1979, Electrical Times. (H 17)

DRAUGHTSMEN. Britain's leading design consultants and contractors require urgently Senior Switchgear Draughtsmen, also Juniors to train as Switchgear Draughtsmen. Good salaries and prospects of advancement for suitable applicants. Pension scheme. —Write in confidence, quoting reference ET, to John A. Smith Ltd., 21 Lichfield Street, Wolverhampton. (G 714)

ELECTRICAL ENGINEERS required by major British oil company for several months' training in U.K. in power-station work for eventual service in the Middle East. Minimum qualifications: Higher National Certificate in Electrical Engineering, with one year's industrial experience. A salary is paid while in U.K., together with contribution to cost of living if away from home. Overseas posts offered to successful trainees will carry attractive salary plus a generous allowance in the local currency, free passages out and home, free medical attention, good leave arrangements, pension scheme.—Write, giving personal particulars and details of qualifications and career to date, quoting Department F.198, to Box No. 2946, at 191 Gresham House, E.C.2. (G 93)

ELECTRIC lamp manufacturers in North London require SENIOR and JUNIOR TECHNICAL ASSISTANTS in special tungsten lamp manufacture. Experience in lamp-making essential for senior position. Duties will involve process and quality control.—Write, stating age, qualifications and experience, to Box No. 1971, Electrical Times. (H 5)

ENGINEERS required for Steam Turbine Design Department of large manufacturer in the Midlands. Candidates should have technical qualifications up to Higher National standard, preferably with shop and drawing office training.—Write: Box No. 1989, Electrical Times. (H 66)

ENGLISH ELECTRIC, Stafford, require TRANSFORMER DESIGN ENGINEERS for high-power systems in which surge impulse phenomena is a primary consideration. Good engineering qualifications desirable, and practical experience on transformer design problems essential.—Write, giving full details, quoting ref. 225D, to: Central Personnel Services, English Electric Co. Ltd., 24-30 Gillingham Street, London S.W.1. (H 68)

EXPERIENCED SENIOR DRAUGHTSMEN urgently required by a well-known manufacturer for employment in the Midland and London areas. Excellent opportunities for men experienced in switc. gear layouts and design. These are senior vacancies carrying salaries of up to £900 per annum, and good possibilities exist for the provision of accommodation in the Midland area for suitable married applicants.—Write, giving full details of age, qualifications and previous experience, quoting Ref. ADA, to Box No. 1959, Electrical Times. (G 810)

FERRANTI LIMITED require an energetic man to take charge of heavy engineering assembly shops. Candidates must have sound engineering experience, but above all must have proved qualities of leadership and drive. The position carries responsibility to the Works Manager and involves the supervision of Foremen. Salary will depend on experience and ability and a high figure will be paid to a suitable man. The Company has a staff pension scheme.—Application forms from the Staff Manager, Ferranti Limited, Hollinwood, Lancs. Please quote Reference T.S. (G 877)

FERRANTI LIMITED invite applications for senior appointments of GRADUATE ENGINEERS with industrial experience in the design of electricity meters. The posts to be filled carry senior responsibility with excellent prospects, generous salary and pension.—Application forms from the Staff Manager, Ferranti Limited, Hollinwood. Please quite reference M.E. (H 30)

LEADING Electric Cooker Manufacturer requires competent and experienced DEMONSTRATOR (female) based on the West of England, resident in or near Bristol an advantage.—Write, stating age, qualifications, experience and salary required, to Box No. 1983, Electrical Times. (H 34)

MAINTENANCE ELECTRICIAN for sawmill in West Africa. Age up to 35 years (approximately). Must be able to work on own initiative. Tour of service 12-15 months. Salary, £340 per annum plus production bonus. Initial kit allowance, £40. Free furnished quarters. Fully paid home leave of one week for every month's service. —Apply by letter, Box No. 1969, Electrical Times. (H 4)

NORTH WESTERN GAS BOARD, Liverpool Undertaking, invites applications for qualified ELECTRICIANS for maintenance work. Successful applicants will be required to pass a medical examination.—Applications to be sent by letter to the Chief Personnel Officer, Radiant House, Bold Street, Liverpool 1. (H 12)

REPRESENTATIVE required by old-established manufacturers of electric wiring accessories for the Lancaster and Yorkshire areas, on salary, expenses and commission.—Apply, with details of experience, etc., Box No. 1967, Electrical Times. (H 3)

SENIOR ELECTRICAL DRAUGHTSMEN required by established British company. Experience of power distribution and lighting installations as applied to the oil refining and chemical industries preferable. Qualifications to H.N.C. standard. Substantial salaries paid.—Write, stating age, qualifications and experience, to: Drawing Office Personnel Officer, Foster Wheeler Ltd., 3 Ixworth Place, London S.W.3. (H 50)

SENIOR ELECTRICAL DRAUGHTSMEN required capable of designing, with minimum of supervision, electrical engineering installations for all types of buildings.—Reply, stating experience, age and salary required, to J. Stinton Jones and Partners, Consulting Engineers, 21 Gloucester Place, London W.1. (H 24)

TECHNICAL REPRESENTATIVE required with existing connection with research and purchasing branches of Government department and nationalised industries, etc., to further develop existing sales of specialised cables and cable couplings, etc.—Write, Box No. 1981, Electrical Times. (H 33)

TELEPHONE MECHANIC. A vacancy exists at a large works in Neath district, South Wales, for a Telephone Maintenance Mechanic experienced in the maintenance of Strowger type automatic exchange apparatus and associated equipment. Applicants must be capable of locating and repairing faults on overhead lines and multicore telephone cables and on subscribers' apparatus.—Apply to Box No. 1945, Electrical Times, stating age, experience, etc. Envelope to be marked "Telephone Mechanic". (G 771)

THE General Electric Co. Ltd. has a vacancy with their agents in Dar-es-Salaam, Uganda, for a professional ELECTRICAL ENGINEER who has served an apprenticeship with an electrical manufacturer and has had previous sale and administrative experience. Age not to exceed 40 years.—Apply in writing, giving full particulars of age, education, training and experience, to Staff Manager, Magnet House, Kingsway, W.C.2. (H 10)

THE General Electric Co. Ltd. invites applications for the position of RESIDENT ENGINEER in Uganda, based in Kampala. This is a senior appointment and applicants must have a professional engineering qualification and have served an apprenticeship with an electrical manufacturer. Previous experience as an electrical engineer is essential and overseas service preferable. Age not more than 40 years. The position carries a substantial salary.—Apply in writing, giving full particulars of age, education, training and experience, to Staff Manager, Magnet House, Kingsway, W.C.2. (H 11)

TO meet an expanding programme applications are invited from SENIOR DRAUGHTSMEN for posts in the Switchgear Drawing Offices of the English Electric Co. Ltd., Stafford. Excellent opportunities exist for men having experience in any of the following :—Layout of indoor or outdoor switchgear, preparation of schematic and detail diagrams, mechanical design.—Apply giving full particulars of previous experience quoting reference 141 A to Central Personnel Services, English Electric Co. Ltd., 24/30 Gillingham Street, Westminster, S.W.1. (G 740)

TRAINEE or JUNIOR SHIFT ENGINEERS for duty in modern Power Station required for Middle East service by large oil company. Salary according to age/experience, plus substantial allowances. Pensionable posts. Paid Home Leave every two years. Aged preferably under 30, applicants must have had regular training in electrical and mechanical engineering with technical qualification of H.N.C. standard.—Write, giving full details and quoting No. 48, to Box 3822, c/o Charles Barker and Sons, Ltd., 31 Budge Row, London E.C.4. (H 25)

APPOINTMENTS WANTED

ELECTRICAL AND MECHANICAL ENGINEER, Associate I.E.E., seeks position with consultants as assistant engineer, or with large contractors as supervisor. Age 41. Present position Assistant Chief Engineer. Preferably South of England.—Box No. 1985, Electrical Times. (H 46)

EXPERIENCED ELECTRICIAN, age 28, seeks permanent progressive employment in South or South-West England.—Box No. 1923, Electrical Times. (G 702)

WORK WANTED

A.C. and d.c. Motor Rewinds and Repairs. Prompt service, fully guaranteed.—Edgware 8631 (4 lines). Service Electric Co., Ltd., Stanmore, Middx. (D 324)

ARMATURE SERVICE CO. LTD., Haddington Street, Hove (Tel. 32666), electrical engineers and winding specialists. Distance no object. (F 739)

CASTINGS, Fisher Foundries, Ltd., Greet, Birmingham, have capacity for brass, gun metal and soft grey iron machine moulded repetition castings weighing 1-30 lb. Loose pattern work up to 3 cwt. Delivery by road to all parts. Tel.: B'ham, Victoria 0197. (F 270)

STANLEY L. LYONS, L.S.I.A., Registered Lighting Engineer (I.E.S.). Consulting illuminating engineer & designer. 97 Latchmere Road, S.W.11 (BAT. 5047). (G 797)

WANTED

A.C./D.C. MOTORS, STARTERS, complete change-over installation, etc.—A.A. Electrical Co., Ltd., 67 Rothschild Road, Chiswick Park, W.4. Phone: Chiswick 5105 (A 20)

ALL types of electrical DOMESTIC APPLIANCES and ACCESSORIES required by exporter and manufacturer.—Box No. 1963, Electrical Times. (H 1)

ALL types of HEATING ELEMENTS wanted.—Box No. 1965, Electrical Times. (H 2)

ELECTRICAL CONTRACTING or radio business required (limited company) showing substantial trading loss usable for tax relief against future earnings. Replies treated in strictest confidence.—Box No. 1975, Electrical Times. (H 15)

SCRAP ACCUMULATOR PLATES and Sediment wanted, any quantities. Also Storage Batteries purchased and dismantled.—Phone or write Elton Levy Co., Ltd., St. Ermin's (West Side), Caxton Street, London, S.W.1. Phone: WHItehall 9621/2/3. (A 3)

SPOT WELDER, about 50 kW, 400 V.—Homeric Cutlery Co., Ltd., Chambers Lane, Grimesthorpe, Sheffield 4. (H 36)

WANTED, ROTARY CONVERTERS, any size.—Universal, 221 City Road, London E.C.1. (A 16)

WANTED for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of second-hand machinery and plant for re-use.—W. and H. Cooper, Ltd., 176 Brady Street, Bethnal Green, E.1. (A 1)

WANTED.—Large quantity of 4-in. outside diameter TUBES from the dismantling of old Babcock Water-tube Boilers. Best prices paid. Prepared to purchase Babcock and Wilcox Water-tube Boilers for dismantling. —Apply, giving full details, to Midland Iron and Hardware Co., Cradley Heath. (A 5)

WANTED, D.C. and A.C. ball-bearing MOTORS, MOTOR GENERATOR SETS, DYNAMOS and ALTERNATORS.—Full details to Britannia Manufacturing Co., Ltd., 22-26 Britannia Walk, London, N.1. (A 13)

AGENCIES

T. P. DATTA, B.E., M.I.E. (INDIA), A.P.I.C. (CANADA). Formerly Assistant Registrar of Trade Marks, Dy. Controller of Patents and Designs in the Patent Office (India) offers his services to all interested in patents, designs and trade marks in India and Pakistan.—Please write to Post Box No. 10005, Calcutta, India. (G 818)

FOR SALE

CABLES & WIRE

FOUR continuous lengths (about 450 yards per each) P.B.J. 190/44 CABLE by St. Helens. Hard drawn, Insulated. To P.O. specifications. As new, 6 months' use only. Also insulators D irons and 9in. bolts for the above. —T. Robb, Stanwell, Staines. (H 72)

TOUGH RUBBER CABLE available, all sizes and types; non-standard lengths (25 yds to 50 yds). Special prices quoted for regular buyer. Must be a user. Guaranteed strictly to BSS.7.—Box No. 1967, Electrical Times. (H 65)

DOMESTIC APPLIANCES

"MORAHEAT" IMMERSION HEATERS

16" to 42" with Satchwell Thermostat, all voltages and intermediate loadings, fully guaranteed, no P.T.

ATTRACTIVE TRADE TERMS

Apply Agent:

W. TYLER, 20 Finnemore Road, Little Bromwich, Birmingham 9. (G 817p)

IMMERSION HEATERS. Grubb 4 kW. No purchase tax. All lengths, 16 in. to 36 in. Standard voltages. Provision for intermediate loadings. Fully guaranteed and immediate delivery. Write for illustrated brochure, latest lists and trade terms to distributors.—John Owner and Co., Ltd., Springfield Road, Birmingham 13. Tel.: Spr. 2939. (C 392)

ENGINEERING PLANT & MATERIALS

WELDING PLANT. Several Motor Generator Arc Welders, single, double and multi-operator up to 600 amps. Input 400/440 V. 3-phase, 50 c.s. Also several single and double operator transformer arc welders. All modern units by well-known makers. Attractive prices.—Full details, write: Thos. W. Ward Ltd., Albion Works, Sheffield. Phone 26311 (Ex. 347). (G 598)

GENERATING PLANT

"ALLEN" GENERATOR FOR SALE, 125 kW, 250 V d.c., 500 amp. Driven by 200 h.p. vertical diesel engine, compressed air starting with compressor and slate panel, switchboard connections, tank.—Inspect at works, W. England, F. J. Edwards Ltd., 359 Euston Road, London N.W.1. (H 70)

ALTERNATORS. 706-kVA by English Electric Co., for 3,300/3/50, 123·5 amp, 0·8 P.F., speed 428 r.p.m. 14 pole, revolving field type, 4 wire. Mounted on fab. baseplate with exciter.

New and unused 600-kVA by Met-Vick, 3,300/3/50, 0·8 P.F., speed 500 r.p.m. 4 wire. Protected type with direct coupled exciter. Overload cap. 25% 2 hr.

208-kVA by English Electric Co. for 440/480/3/50, speed 750 r.p.m. Protected type, with single pedestal R.B.

160-kVA by G.E.C. (U.S.A.) for 440/3/50, 4 wire, speed 750 r.p.m. Protected type, end-shield B.R.B.

150-kVA by Bruce Peebles, for 440/3/50, speed 750 r.p.m. Revolving field, 2 end-shield B.R.B., with exciter.

125-kVA by L.D.C., for 350/3/50, speed 750 r.p.m. Rotating field type, screen protected, end-shield B.R.B., with direct coupled exciter.

125-kVA by B.T.H., for 480/3/50, 150 amps, 0·8 P.F., speed 1,000 r.p.m. 6 pole, revolving field type, screen protected, 2 B.R.B., excitation full load V 96, amp 14·5. Flange mounted exciter.

112·5-kVA by Crompton for 400/230/3/50, 4 wire, speed 750 r.p.m. Revolving field type, encl. ventilated, end-shield B.R.B. Direct coupled exciter.

100-kW by Greenwood & Batley, for 400/3/50, 145 amp, speed 500 r.p.m. Open protected type, 3 pedestal R.O.B. With exciter.

98-kVA by Brush for 400/3/50, 0.8 P.F., speed 1,000 r.p.m. Revolving field type with direct coupled exciter.

GEORGE COHEN SONS & CO. LTD., Wood Lane, London W.12. Tel.: Shepherds Bush 2070 and Stanningley, nr. Leeds. Tel.: Pudsey 2241. (H 52)

DIESEL ALTERNATOR SETS from stock: 400/440 V. 3-phase, 50 c/s; 167 kVA "Waukesha/G.E.C.," 1,000 r.p.m.; 150 kVA "Petter/Brush," 500 r.p.m.; 135 kVA "Blackstone/Metro-Vick," 500 r.p.m.; 150 kW "General Motors/Westinghouse," 1,000 r.p.m.; 100 kVA "Deutz," 1,000 r.p.m.; 69 kVA "McLaren/Brush," 1,000 r.p.m.; 65 kVA "Meadows/McFarlane," 1,500 r.p.m.; 62·5 kVA "McLaren/Bruce-Peebles," 1,000 r.p.m.; 50 kVA "National/Bruce-Peebles," 750 r.p.m.; 20 kVA "Lister/Metro-Vick," 1,000 r.p.m. Full details with price post free on request.—Thos. W. Ward Ltd., Albion Works, Sheffield. Phone 26311 (Ex. 347). (G 596)

FOR SALE one Crompton Parkinson 300 kW continuous current electric GENERATOR with control panel. Single bearing machine, open type. Normal full load 300 kW, speed 375 r.p.m. Cast iron U-bed plate. Voltage 460-230, 3-wire system with static balancer. The machine arranged for direct coupling to 450 b.h.p., two-crank compound extraction type Belliss engine (A type). Available September, 1951.—J. John Masters and Co., Ltd., Abbey Match Works, Abbey Rd., Barking, Essex. (Tel.: Rippleway 2466). (H 73)

GENERATOR FOR SALE, 220 V, d.c., 130 amps, with control panel. Driven by "Tangye" 34 b.h.p. single-cylinder horizontal diesel engine. Inspection at works in W. England.—F. J. Edwards, Ltd., 359 Euston Road, London N.W.1. (H 69)

LISTER DIESEL GENERATOR set 15 kW, 400 V, 3-ph. 50 c/s, mounted on steel base, complete with control panel; can be seen working under load. £575, or near offer. —Safety Tread Ltd., Dace Road, London E.3. Amherst 4407. (G 786)

MOTOR GENERATING SETS. Built to customers' requirements of new and used plant. Many in stock at Wembley, inspection invited. Please send us your inquiries. We can help you to save time. Over a THOUSAND MACHINES ALWAYS IN STOCK.—Dynamo and Motor Repairs Ltd., Wembley Park, Middlesex. Telephone: Wembley 3121 (4 lines). Also at Phoenix Works, Belgrave Terrace, Soho Road, Birmingham. Telephone: Northern 0898. (A 2)

ONE Dorman 6 DL. DIESEL ENGINE for sale, recond. by makers, 100 h.p. at 1,000 r.p.m., clutch and vee rope pulley.—Masefield & Reynolds Ltd., Marlow St., Walsall. Phone Walsall 3777. (G 796)

RADIATOR cooled 55 h.p. Crossley DS2 Diesel Engine on Bed, direct coupled E.C.C. 43 kVA Alternator, 400/3/50 and 230/1/50 supply. Complete installation as working, cheap for quick sale.—J. L. Ion Ltd., Engineers, Milnthorpe, Westmorland. 'Phone 34 Milnthorpe. (H 35)

LIGHTING EQUIPMENT

ELECTRICAL industries greatest value: 5 ft V-type FLUORESCENT FITTINGS with built-in control gear. £2 19s. 6d. complete, less tubes. Send 1d. stamp for lists.—Northern Industries, Snow Hill, Manchester 4. (D 50)

PURLEY CHOKES AND BALLASTS. Silent operation, excellent performance, efficient, long life, vacuum impregnated, quick delivery. Low price (e.g. Purley Queen, 80 watts, 14/6 each, less quantity and cash discounts). Quotations for export.—F. W. Blanshard, Ltd., (Dept. ET), Purley, Surrey. (E 343)

METERS

A.C./D.C. SLOTMETERS (prepayment meters), all types and sizes. We supply Electricity Boards and Govt. Depts. Billiard Switches and Time Switches from stock. If you need reliable instruments write to: Brent Electrical Co., 6 Holmdale Gardens, Hendon, London N.W.4. (A 15)

A.C. AND D.C. Quarterly and Prepayment METERS.—Electric Meter Company, Castor Road, Brixham (H 31)

HOUSE SERVICE METERS, from 5/-. Guaranteed two years.—Electric Meter Co., Castor Rd., Brixham.(H 32)

HOUSE-SERVICE METERS, a.c. or d.c., quarterly or prepayment.—Universal Electrical, 221 City Road, London E.C.1. (C 51)

METERS, a.c. and d.c., new and reconditioned, all types. Quarterly, single and three-phase, 3 and 4-wire, 2½ to 1,000 amp. Prepayment, single and double tariff, single, dual and triple coin, fixed and variable tariff, 2½ to 50 amp. M.D.I. Billiards Switches, Rent Collectors. Prices from 5/- carriage paid, Two-year Guarantee. Immediate delivery. Illustrated catalogue from : The Electric Meter Company, Castor Road, Brixham. (H 30)

MOTORS & STARTERS

A.A. ELECTRICAL CO.—FOR A.C./D.C. MOTORS, SWITCHGEAR, EXHAUST FANS, HOISTS, REDUCTION GEARS, new or reconditioned units.—Chiswick 5105, Fairlands 8279, 67 Rothschild Road, W.4. (A 19)

ELECTRIC MOTORS, GENERATORS, TRANSFORMERS A.C. & D.C.
STARTERS, SLIP RING & D.C., SEMI-AUTOMATIC
Any voltage, new, short delivery, all types of revolving electrical power.
ELECTROPOWER COMPANY LIMITED
Kingsbury Works, Kingsbury Road, London N.W.9. Telephone: COLindale 4621-2. (D 17p)

A.C. and D.C. MOTORS, GENERATORS, from stock.—Service Electric Co. Ltd., Honeypot Lane, Stanmore, Middx. Edgware 8631/4. (A 476)

A.C. and D.C. MOTORS, GENERATORS, SWITCHGEAR, etc., always in stock. Let me have your inquiries.—G. E. Whittaker, Wellington Mill, Bolton Road, Blackburn. Tel. 7232. (A 12)

A.C. and D.C. MOTORS, ALTERNATORS, Generators, Generating Sets, Transformers, Welders, Plating Equipment, Control Gear, Switchgear, portable Electric Tools, etc. Write for current electrical stock list, post free.—Thos. W. Ward Ltd., Albion Works, Sheffield. Phone 26311 (Ex. 347). (G 595)

A.C. and D.C. MOTORS, all sizes, large stocks, fully guaranteed.—Milo Engineering Works, Ltd., Milo Road, East Dulwich, S.E.22 (Forest Hill 2278-9). (A 10)

BANKRUPT STOCK MUST BE CLEARED. 400/3/50 Squirrel cage, foot-mounted, ball-bearing Induction MOTORS, brand new. 100/1/8 h.p., 200/1/6 h.p., 2,900/1/4 h.p., 45/- each ex-stores. 200/1/3 h.p., 200/1/2 h.p., 50/- each ex-stores. Can be inspected.—Watkins, 85 Beaconsfield Villas, Brighton, Sussex. (H 21)

BRAND NEW A.C. MOTORS FROM STOCK, 1/3rd to 150 h.p. slip ring and squirrel cage, 400/440 V, 3-phase, 50 c/s, at 750, 1,000 and 1,500 r.p.m. With or without control gear. Immediate despatch from stock. Attractive prices. —Full details, post free, from Thos. W. Ward Ltd., Albion Works, Sheffield. Phone 26311 (Ex. 347). (G 597)

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10 S. and C. type 11 F.35 Circuit Breakers.
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3 G.E.C. Circuit Breakers. 2 G.E.C. Isolators.
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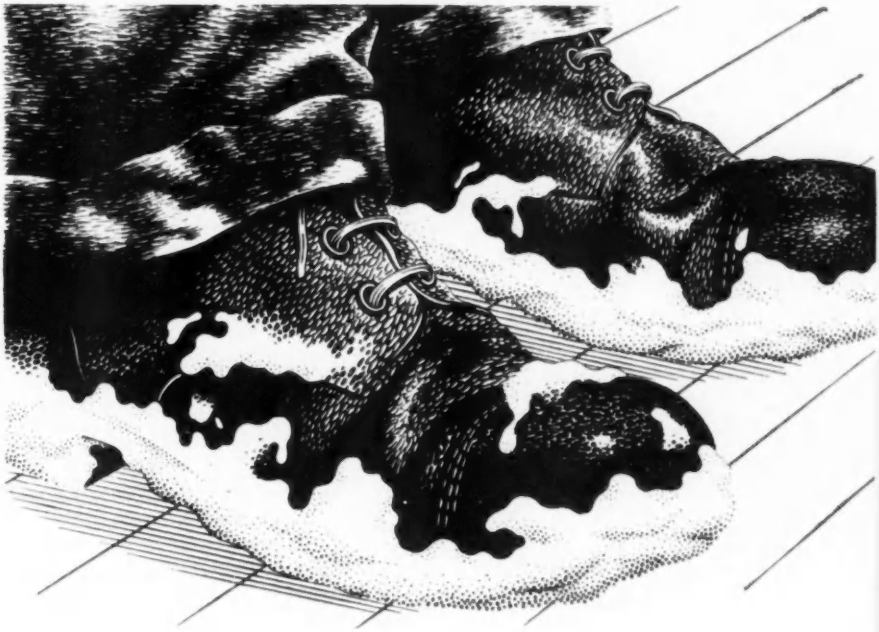

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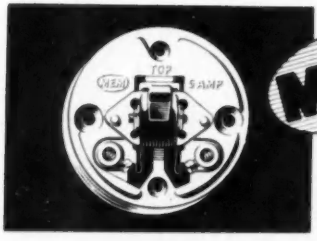

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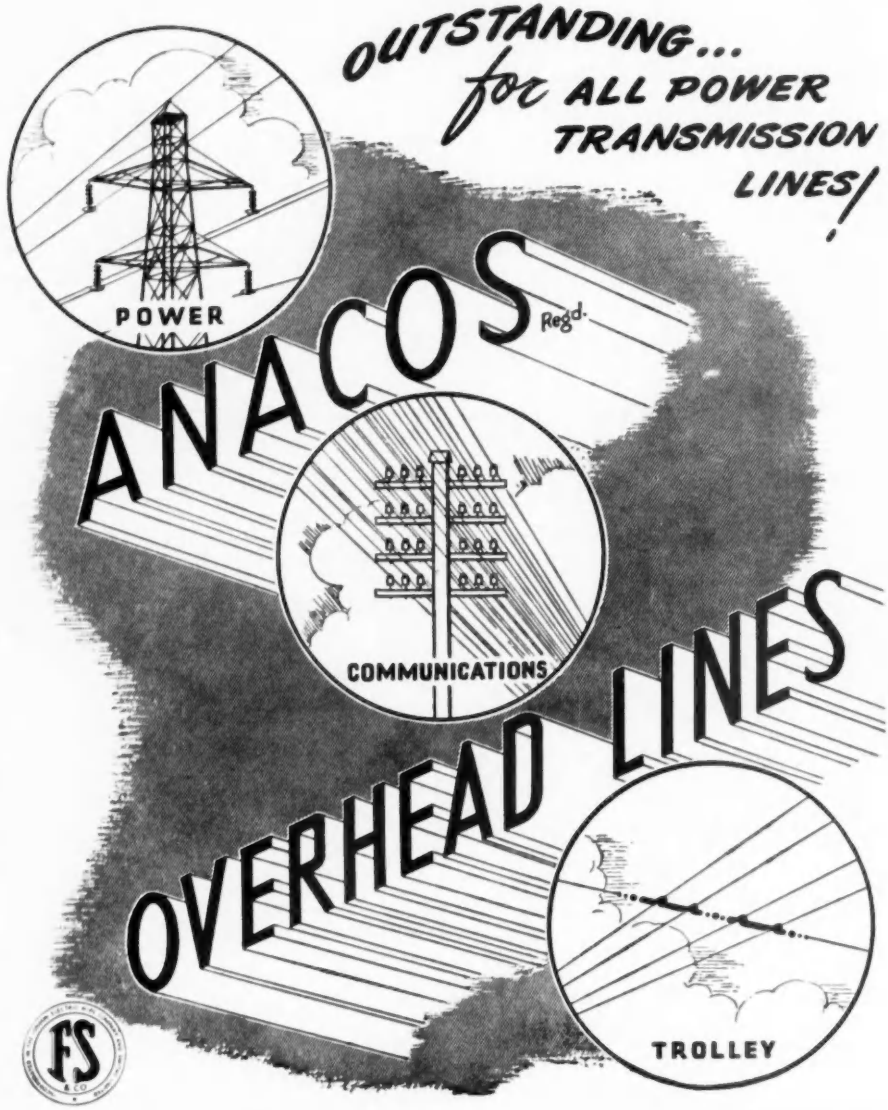

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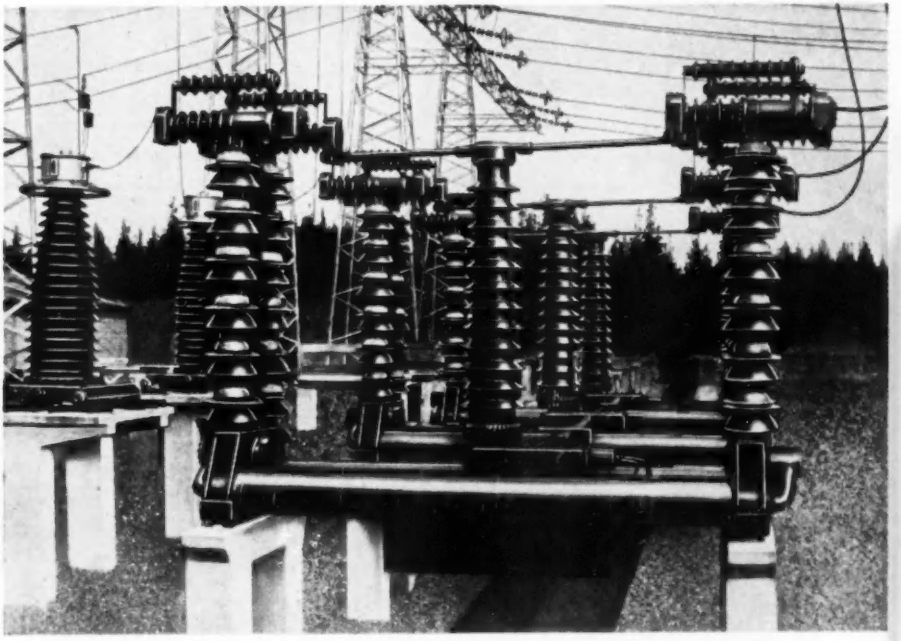

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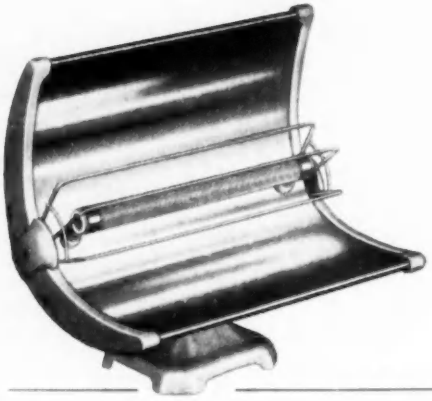

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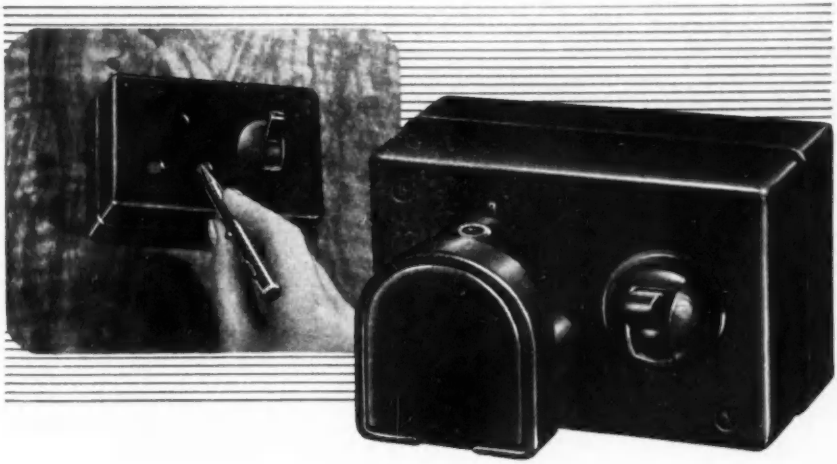

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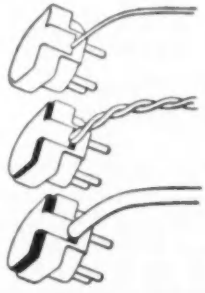

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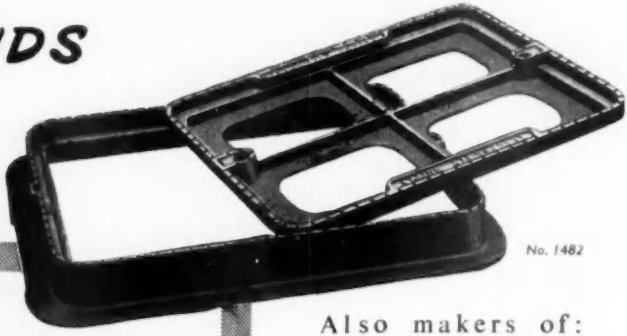

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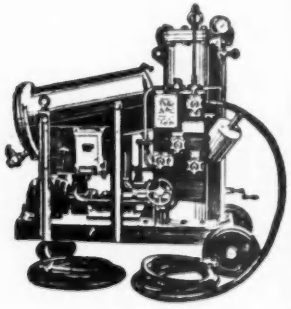

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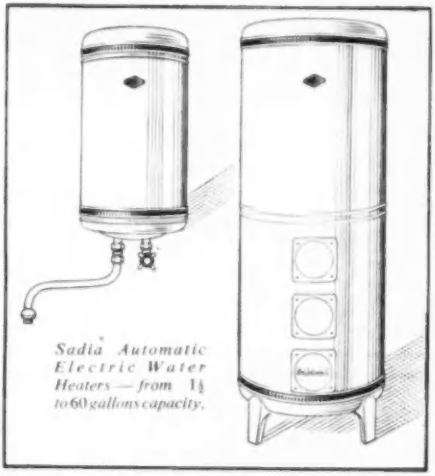

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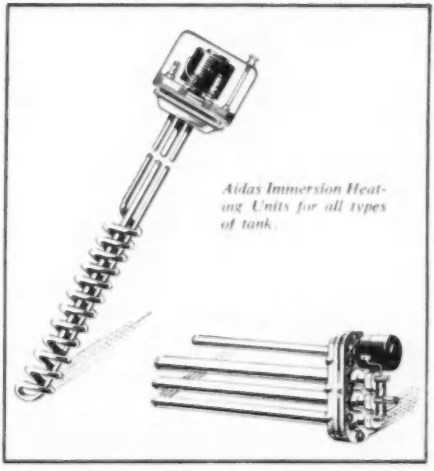

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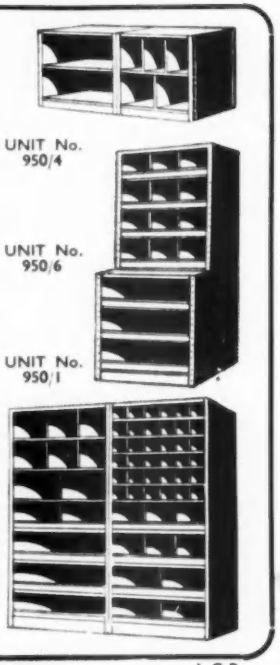

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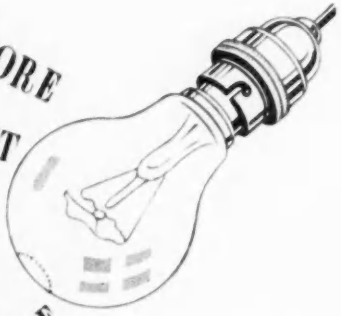

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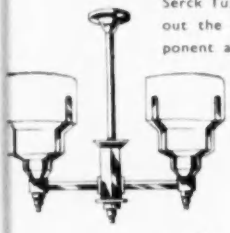

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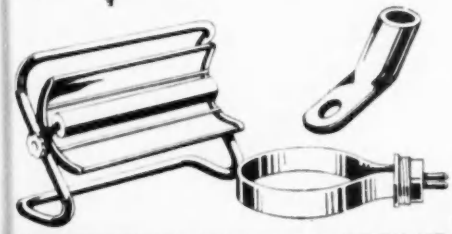

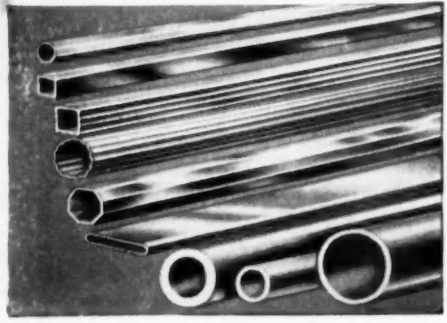

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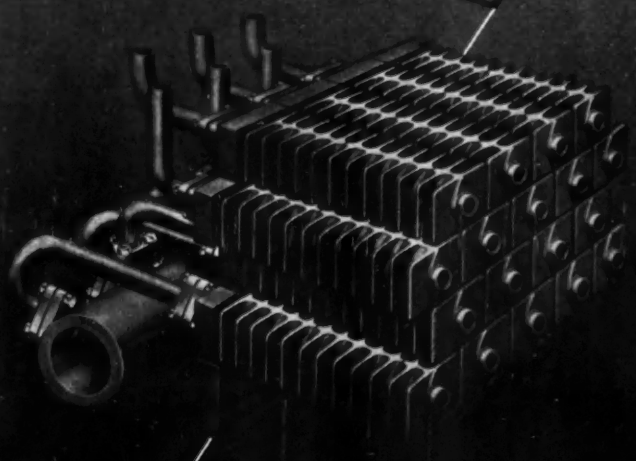

The illustration shows Green's Premier Diamond Economiser, Type 12, with steel tubes and cast-iron gilled sleeves.

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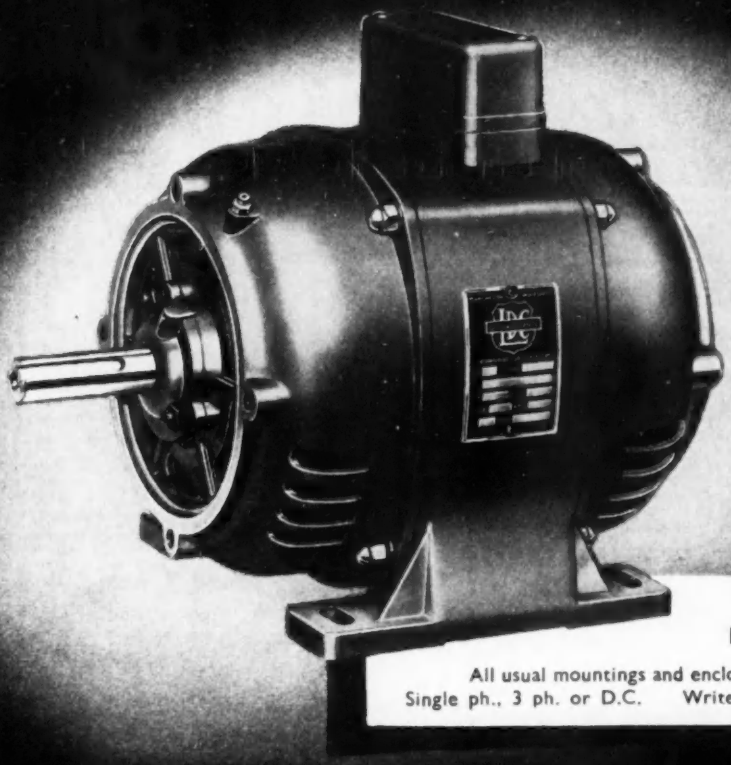

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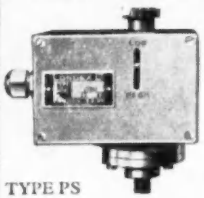

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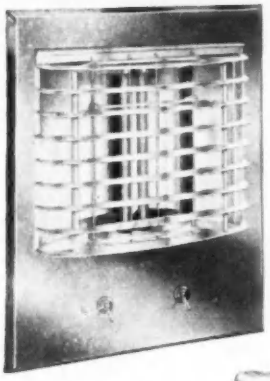

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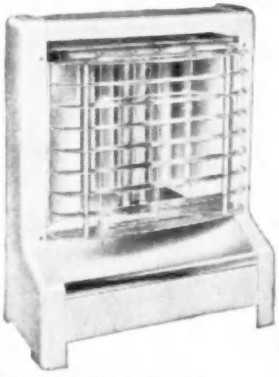

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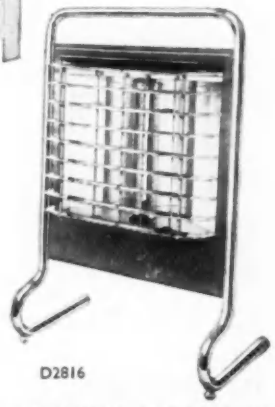

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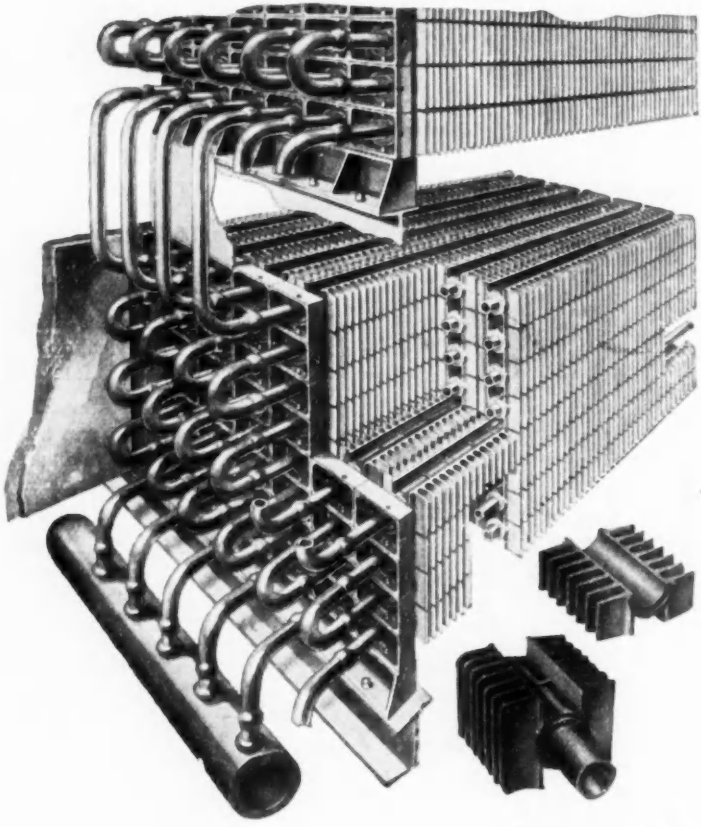

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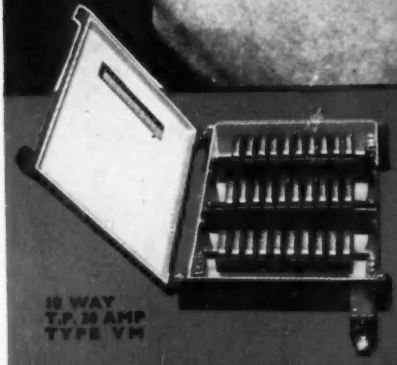

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